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Women's acquisition of literacy skills and health knowledge in Nepal : a comparative study of non-formal education approaches.

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WOMEN'S ACQUISITION OF LITERACY SKILLS AND HEALTH KNOWLEDGE IN NEPAL: A COMPARATIVE STUDY OF NON-FORMAL EDUCATION APPROACHES

A Dissertation Presented

by

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ABSTRACT

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AND HEALTH KNOWLEDGE IN NEPAL:

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The goal of this dissertation is to investigate the extent of difference in effectiveness of three non-formal education approaches in helping women acquire literacy skills and/or health knowledge in Nepal, and to propose hypotheses about factors or "influences" that might explain these differences. This exploratory study provides insights that program planners, researchers and policy makers can use for focusing further research on which non-formal education program designs for women will bring about the greatest increase in literacy skills and health knowledge.

Four sample groups of women were compared: (1) 74 women in three different sites who attended monthly Mothers' Group health education meetings (with no literacy

instruction); (2) 38 women in two different classes who completed a 6-month basic literacy course (with no health instruction); (3) 65 women in three different classes who completed a 6-month health/literacy course and 38 of these women who completed a 3-month post-literacy/health course; and (4) 50 women in two different sites who attended neither literacy course nor Mother's Group meetings. Data related to "acquisition" included literacy test scores and health knowledge oral interview scores; data related to possible "influences" included demographic data, and information about community and classroom context. Data were coded and analyzed by standard statistical procedures.

The findings indicate that non-formal education of any kind is effective in helping women acquire some degree of both literacy skills and health knowledge. Type of non-formal education approach was not significantly related to greater literacy skills acquisition but it was related to greater health knowledge acquisition. Participation in the integrated health/literacy course was related to higher levels of health knowledge than was participation in health only or literacy only non-formal education approaches. Participation in the post-literacy course was associated with greater literacy skill and health knowledge acquisition than participation in either schooling or other types of non-formal education at a basic level. In addition, literacy skill acquisition appeared to be influenced by class or community factors (hours of instruction, facilitator characteristics, economic status of the community) and health knowledge acquisition was influenced by individual factors (marital status, age, radio ownership, number of children).

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CHAPTER 1

INTRODUCTION

Statement of the Problem

> "Promote people-centred sustainable development, including sustained economic growth, through the provision of basic education, life-long education, literacy and training, and primary health care for girls and women."
>
> The Beijing Declaration and the Platform for Action on Women and Health, World Conference on Women, 1995

In recent years, public health and educational researchers have documented the strong connection between the educational level of mothers and reductions in children's under-five mortality/morbidity rates (Grosse and Auffrey, 1989; Caldwell, 1986; Tressaras, et al, 1992; Cleland and van Ginneken, 1988) and reductions in fertility (Schultz, 1993; Martin, 1995). Simply put, this body of research indicates that more educated mothers have fewer and healthier children. Some researchers contend that "investments in education are more likely to pay off in improved health" than are investments in nutrition or medical care (Sagan, 1987, p. 201). In a 1990 report to USAID about basic education, Lindblom claims that "While there is no magic pill that will quickly generate constructive and lasting development, and no magic bullet that will eliminate poverty, hunger and disease, providing basic education for all might be the closest thing we have...given the recognized, tremendous synergistic power of basic education, especially of women, to promote sustained, equitable development and economic growth" (p. 51).

"Literacy" is often used in the literature interchangeably with "education", so that aggregate, multi-country analyses correlating either literacy rate (Tressaras, et al, 1992) or women's school grade completed (Martin, 1995; King, 1990) to positive outcomes can both be found. However, educational funding in most countries is predominantly allocated to formal education, so the majority of literate women probably became literate as school girls, and it is assumed that, even without actual literacy testing, the level of female education in a country is an estimate of the female literacy rate, and as such, serves as the predictor variable for health and fertility. Through some recent studies by LeVine, et al (1994b) at the Harvard Maternal Schooling and Behavior Project, where women's actual literacy skills were used as a predictor, a hypothesis is emerging that literacy skills themselves (or an underlying factor connected to literacy) may be the important predictor of health and fertility, over and above number of years of school completed.

For the purposes of this study, "literacy" is defined as a set of reading and writing skills; at any given point in time and for any given reading and writing task, individuals may possess such skills on a continuum from very low level (say, inability to read letters or hold a pen) to very high level (say, ability to write a book). There is no universal dividing point at which someone is "literate" or "illiterate". "Schooling" is defined as some level of exposure to or attendance at formal school as a child. "Education" is defined as exposure to some type of schooling or non-formal education, and "basic education" is defined as formal or non-formal education that focuses on helping children or adults acquire fundamental reading, writing and math skills that can serve as the basis for continued

education and/or for functioning effectively in daily life that requires some degree of literacy and numeracy skills.

Since literacy skills are a sub-set of the skills learned in a basic education setting, which women can acquire as girls in the formal school setting or as adult women in a non-formal education class, it is not known whether literacy acquired by women out of school as an adult correlates as strongly with child health as does literacy acquired during schooling. However, funders such as the U.S. Agency for International Development and policy makers in both education and health are becoming more interested in offering non-formal education for adult women with components of both literacy and health instruction (Intersectoral Action for Health, 1986; Stein and Bender, 1989; Hammad, et al, 1992; USAID Girls' and Women's Education project, 1996). The growing belief among development funders is that education provides critical skills on which individual and community development can be based, and the hope is that equipping adult women with literacy skills and knowledge of appropriate health behaviors will increase the likelihood that their children will benefit in the same way as the children of schooled mothers.

Public health and population programs in most developing countries have for years focused on some form of non-formal education (usually without a literacy component) to help women adopt new health and family planning behaviors. Health education and promotion activities have included social marketing efforts, informal education through community health volunteers, and training programs, which can use drama, pictures, lecture and/or small group discussions to present content. With the new interest in literacy and basic education as a factor in women's ability to improve health care in the family,

health professionals in particular have many questions about the efficacy of including literacy as part of their strategy to reach women through health promotion programs. For example, if literacy is included, will it contribute more or less to our health-related goals than what we are doing already? How effective is literacy alone, without an emphasis on health? Is it worth the extra time and cost to develop programs which integrate literacy education with health education? Yet policy makers and program planners in public health and education have very little information about the efficacy of various approaches, such as schooling, health education programs, basic literacy education programs, or integrated literacy and health education programs, in helping women acquire strong literacy skills and knowledge about health (Grosse, 1982; Gwatkin, 1982; Lind, 1990).

Literacy education programs themselves fall generally into three types. The first is the "pure literacy" program, in which reading and writing skills are the primary focus of the instruction. In this case, the content of the text used to teach literacy skills is inconsequential. A good example of this is the Laubach method of literacy instruction used in the United States. The second type, usually called "functional literacy", places as much emphasis on content as on literacy skills, with the goal of helping adult learners use literacy to function more effectively as workers, parents, and citizens; this approach typically uses as content a range of topics relevant to adults' lives, such as agriculture, reforestation, social issues (e.g., domestic violence), health and community development. The third type, called "integrated literacy" or "content-based instruction", uses literacy as a vehicle for conveying specific information or content which, it is hoped, adults can use

to improve their lives in concrete ways. Thus, literacy has become a component in programs which focus specifically on agriculture, health and family planning, or income generation.

Previous research into the effectiveness of the different types of approaches to non-formal education presents us with two opposing hypotheses:

1. *Combining instruction in reading and writing skills with specific content over a given period of time* ***enhances*** *both literacy skill development and acquisition of specific knowledge because adults are more motivated to learn material relevant to their lives and aspirations, and therefore skill and knowledge acquisition will be more than if either were taught separately (Ballara, 1991; Bown, 1990).*

2. *Combining instruction in reading and writing skills with specific content over a given period of time* ***detracts from*** *both literacy skill development and acquisition of specific knowledge because time is taken away from one for the other, and therefore skill and knowledge acquisition will be less than if either were taught separately (Lind, 1990).*

The question is not only which hypothesis is correct but under what conditions. Depending upon the context, combining literacy instruction with instruction in specific content areas such as health may require much more of a program effort, and thus resources, than does providing health education alone. However, the long-term effects on women's behaviors and capacity for further education may be more cost-effective in terms of impact on health than separate literacy and health programs alone. Although public health and other development professionals may agree that it will be easier in the long-run to reach and teach people who are literate, they need powerful persuasion that it is to the

advantage of their own goals for communicating development ideas that they take on the responsibility of helping people acquire literacy with their scarce resources.

Educators and health professionals in developing countries have special needs for information about approaches to education for women since resources are scarce and needs are great. Nepal is a good example. Education for both literacy and health in Nepal is a strong need and a great challenge. Nepal's illiteracy rate is one of the highest in the world, standing at 74% in 1985, and women represent 70% of the total illiterates in the country (World Bank, 1990). The under-five mortality rate is 130 per 1000 births, one of the highest mortality rates in Asia (World Bank 1993, reported in Acharya, 1994). Reaching women through non-formal education is hindered by isolating geography and scarce resources for adult education. The Ministry of Health and the Ministry of Education both offer education programs for women, and through the recent collaboration on the Health Education and Adult Literacy (HEAL) project, they have indicated that they realize the need to collaborate in order to use educational resources as wisely as possible for the greatest effect. However, they need appropriate information about whether, and under what circumstances, a combined literacy and health education intervention, supported and implemented through the Ministries or through local NGOs, can be effective in increasing women's knowledge and skills. This dissertation research adds to that knowledge base, as well as presenting some hypotheses of factors which influence the success and effectiveness of health-only and literacy-only programs sponsored by the Ministries individually.

Purpose and Rationale of the Study

The purpose of this exploratory study is to investigate the extent of differences in effectiveness of three different approaches to providing literacy skills and health knowledge to women in Nepal, and to propose hypotheses about factors or "influences" other than non-formal education approach that might explain such differences. One non-formal education approach provides health education without literacy instruction, the second approach provides primarily literacy education through a variety of development-related content areas, and the third approach provides literacy instruction with an added health content focus. By comparing the literacy skills and health knowledge acquired by sample groups of women participating in educational programs based on each of the approaches, as well as a sample group who does not participate in any of them, this research will show the nature and extent of differences in literacy skill and health knowledge acquisition associated with these approaches. Considering possible non-design influences, such as women's demographic features, classroom context, and community context, is essential for understanding whether differences between groups are due to non-formal education approach (e.g., program design) per se or due to other learner or contextual factors.

For the purposes of this study, literacy skills are defined by the ability to silently read and write single words, short sentences and paragraphs, demonstrated by the ability to answer questions on a written, 120-point test by making check marks on correct words,

writing single words, writing short sentences, and/or writing short paragraphs; a small number of questions (less than 15 points) also focus on rudimentary math skills such as tallying or simple addition, subtraction or multiplication. Health knowledge is defined by an understanding of basic concepts about health issues such as immunization, oral rehydration, family planning, and first aid, demonstrated by the ability to answer yes/no, multiple choice, or short answer questions on a 31-point oral interview administered individually to each subject.

There are two primary research questions and one secondary research question investigated in this study. Each research question has a number of specific hypotheses to be tested in the process of answering the research question. The primary research questions and their concomitant hypotheses include:

1. *To what extent is there a difference in literacy skills and health knowledge gained (i.e., a difference in test scores) between a group of women who receive literacy instruction, a group of women who receive literacy instruction with a health focus, a group of women who receive instruction in health without literacy, and a group of women who receive no non-formal instruction at all?* The specific hypotheses to be tested as part of this question include:

- Women who participate in some type of non-formal education will acquire more literacy skills and health knowledge than women who have not participated in non-formal education.

- Women who participate in an integrated literacy/health program will acquire more literacy skills than women who participate in a "literacy only" program and more health knowledge than women who participate in a "health only" program.
- Women who participate in a post-literacy/health program will acquire more literacy skills and health knowledge than women who participate only in a basic-level non-formal education program.

2. *What are some of the factors or "influences" that might explain possible differences between groups?* The specific hypotheses to be tested as part of this question include:

- Individual factors (such as age, marital status, previous educational experience, hours of instruction, etc.) may influence literacy skill and/or health knowledge acquisition.
- Literacy skill and health knowledge acquisition are interrelated, such that women who acquire more literacy skills will also acquire more health knowledge.
- Class-related factors (such as facilitator characteristics, class facilities, distance of class from home) may influence literacy skill and/or health knowledge acquisition.
- Community-related factors (such as economic level of village, distance to road or health post, presence of non-formal education committee, etc.) may influence literacy skill and/or health knowledge acquisition.

The secondary research question is:

Given the exploratory nature of this study, what hypotheses emerge from the data that may provide direction for future research on the effectiveness of women's literacy and health programs?

Women throughout the world play an important role in the health and well-being of their families (O'Connell, 1994). In an effort to decrease the high incidence of under-five mortality and the high population growth rate, international funders and governments, as well as non-governmental organizations, are eager to equip women, many of whom are disadvantaged and difficult to reach through existing health care systems partly because of their low literacy skills, with the health knowledge they need to keep themselves and their children healthy. Literacy instruction is one vehicle for reaching women with health messages. Literacy is attractive to program planners because it contains the potential to provide women with the long-term skills they need to access printed information about health that can be widely and cheaply disseminated. The desire for literacy can also be a powerful motivator for participation in non-formal education. Conversely, the inclusion of health information in a literacy class may be a powerful inducement to participate in literacy classes (Stromquist, 1991; Ballara, 1991; Bown, 1990).

My interest in this topic stems from my involvement as a consultant, working for the organization who implemented the pilot health/literacy project for women that is part of this study. Although my involvement is cause for bias, which will be discussed further

in the "Methodology" chapter in reference to limitations of this study, it does give me a firsthand understanding of the need for a clearer understanding and more informed hypotheses about the inputs to and outcomes from non-formal literacy education in Nepal. Specifically, is combining the content area of health with the skill area of literacy in non-formal instruction an effective way to educate women in health and literacy? What are some of the factors, other than non-formal education approach, that may influence how well women acquire literacy skills and health knowledge in Nepal? The answer can provide policy makers and program planners with directions for funding and designing appropriate non-formal education opportunities for women.

CHAPTER 2

BACKGROUND

Literature Review

The background to this study on women's acquisition of literacy skills and health knowledge in Nepal covers a broad range of topics, including the status of girls' and women's education; the connection between women's education and health; the status of adult literacy programs for women; and types of non-formal health and literacy education programs. After a presentation of the main hypotheses about the effects of integrating health with literacy in non-formal education programs for women, and the hypotheses about other factors that may influence the acquisition of literacy skills and health knowledge, the Nepal research context is discussed, including an overview of the specific non-formal health and literacy education programs involved in this exploratory study.

Status of Girls' and Women's Education

Education is now widely recognized as a positive force for improved health and productivity in developing countries. Women's education in particular has been associated with social and economic development in the form of greater gross national product per capita, longer life expectancy, lower infant mortality rates, and lower total fertility rates (King, 1990). Worldwide, girls and women are disadvantaged educationally when compared with men, girls receiving fewer opportunities to enroll in, finish and perform well in school, leading to greater levels of female adult illiteracy. The "gender

gap" in education--the gap between girls' education and boys' education--is widest in the poorest countries (King, 1990), and this gap negatively affects a country's economic development: "large gender disparities in educational attainment appear to reduce GNP" (Hill and King, 1993, p. 19). Even the positive impact of economic growth on lowering fertility and reducing mortality is weaker in countries with wide gender gaps, such that "a country with a wide gender gap will have to raise per capita income more than will a country with a small gap in order to achieve similar levels of social well-being" (ibid, p.6). King and Hill claim that both the total level of female education and the gender gap in education are critical in determining a country's level of social and economic growth. Girls' education has also been positively associated with such social factors as daughters' enrollment and performance in school, women's role in decision-making and status in the family, and women's self-confidence and self-esteem (Floro and Wolf, 1990).

Even though many countries have made progress towards increasing girls' education, girls are still under represented in schools. In Nepal, for example, as of 1989, 35% of students in primary school, 29% of students in lower secondary school, and 27% of students in secondary schools were girls, and only 12% of the teachers are women (Subedi, 1993, using Ministry of Education figures). Such under representation leads to greater levels of female illiteracy worldwide. UNESCO estimates that the number of illiterates in the world is 950 million, and that 70 percent of these are women; in Southern Asia, women represent 61% of the 398 million illiterates (World Education Report, UNESCO, 1993). In the developing countries, the female literacy rate is 20 percentage

points different from males' (56% to 77%), and in South Asia the percentage point difference is 27% (UNESCO, 1993).

Why are girls and women not getting educated? The main reason for girls not attending school seems to be the high costs and low perceived benefits borne by girls' families (King, 1990). In short, families bear the cost of educating children, whether those costs be direct (books, uniforms, fees, etc.) or indirect, "opportunity" costs (lost labor which children would otherwise be contributing to the household if they weren't in school). If the costs are too high, as they often are for poor families, or the benefits of educating girls are perceived as too indirect or too unlikely to yield a return immediately back to the family, then parents (particularly poor parents) have difficulty justifying those costs. The cost/benefit analysis is affected by cultural factors, such as girls leaving the natal household to live and contribute to their husband's household, or traditional values that result in women having reduced opportunities for higher-paying jobs. In such cultures, parents are worried that school-going daughters will forego valuable training in child care or household maintenance that they will need someday as wives and mothers, making the girls less "marriageable". Finally, parents are often reluctant to send their daughters into situations where they fear they will be harmed or corrupted, especially if girls are required to walk great distances to attend school and are out of the household's "sight" for long periods during the day.

Hill and King (1993) conclude that the main reason why many fewer girls than boys are educated is that the benefits of educating girls are social, whereas the benefits of educating boys are private. If educating girls leads to better health and education for

children, these are benefits which are not perceived as having an immediate and positive economic impact on the family since girls in many societies go to live in their husband's family, taking those benefits with them. There is a belief, however, that boys, after education, can obtain employment that will directly benefit the family and that boys will stay within the family that pays the costs of that education (whether direct or opportunity); thus the investment of boys' schooling is paid off.

However, lest we be accused of "blaming the victim", there may be another reason for the non-participation rates for both girls and boys in schooling, which may interact with the above cultural and economic reasons to prevent more girls from being schooled. That reason is the poor quality of primary schooling in many developing countries. A draft report from the recent multiple indicator survey done in Nepal, conducted under the aegis of the National Planning Commission, indicates that although teachers blame parents for not sending their children to school, parents cite as problems a dislike or fear of the teacher (74% of whom in the survey were male) or the fact that the teacher is often not present to teach (Nepal Multiple Indicator Surveillance, draft August 1995). Teachers' frequent absence from Nepali classrooms is a fact confirmed by my own experience teaching in Nepal. One can clearly understand why a Nepali parent might not be willing to let a young girl walk up to 2 hours each day to school, losing the benefits of her household labor (labor that is often extremely critical to the survival of a family at the subsistence level), only to have her sit in a teacherless classroom all day while the teachers play caroms in the headmaster's office.

Connection Between Women's Education and Health

Women's lack of education and low literacy levels is a critical problem, according to recent research documenting women's education as a key factor in children's health and lower fertility. Over the last decade, research has made an undeniable connection between the mother's education level and lower morbidity, mortality and fertility rates in families (Grosse and Auffrey, 1989; Cochrane, et al, 1980), even after controlling for socio-economic status and access to health services (Hobcraft, 1993). Both economic and social gains resulting from girls' education have clearly been documented in multi-country studies (Subbarao and Raney, 1993). Joshi (1994), in reviewing the existing literature, points out that maternal schooling accounts for as much as half of the positive effect on children's health (with socio-economic status being responsible for the other half). Joshi's own research indicates that mothers' schooling was also a predictor for children's height for age (known as "stunting", indicative of long-term nutritional and health status) but not weight for height ("wasting", indicative of short-term nutritional status); wasting was better predicted by husband's education, occupation and employment. LeVine, et al, (1994a) conclude that it is the educational influence of schooling (and not the economic benefits or access to health care resulting from such schooling) that affects birth and death rates. Schultz (1993), analyzing aggregate data from 62 low-income countries to determine the factors affecting fertility decline, concludes that:

> "Some changes associated generally with modern economic growth raise fertility, such as male education, nonhuman capital returns, and the decline in agricultural employment, whereas others such as improved female

> education, urbanization, increased availability of food, and a resulting decline in child mortality, are associated with fertility declines...The education of women is the dominant empirical factor associated with the decline in fertility in the cross section and over time...a critical dimension of development is likely to be the investment in schooling of females relative to males. Growth in income alone lowers child mortality but has little total (reduced-form) effect on fertility...family planning effort does not emerge as an important determinant of fertility." (p. 32)

In addition to documenting the impact of mother's level of schooling on children's health and lower rates or fertility, researchers have also started to investigate the various mechanisms by which education has such positive effects. Joshi's recent research in Nepal (building on the work of LeVine and his colleagues in Mexico, Venezuela and Zambia) aimed to identify some of the results of schooling, most notably the skills and identity which women acquire as a result of schooling. Through a combination of language tasks (noun identification, decontextualized language use, aural comprehension), literacy tasks (reading comprehension), time analysis (observing mother's interaction with children), and observed interaction with medical professionals, Joshi was able to make conclusions about some of the mechanisms which mediate between maternal schooling and childrens' health. Not surprisingly, schooling was a significant predictor of reading comprehension, listening comprehension, and decontextualized language use skills.

Joshi's main question in this research, however, was whether it is the skills (literacy and language use) acquired by schooled women or the identity (modern outlook, seeing themselves as a "teacher" to their children) which causes the effect. Joshi concludes that "acquired listening and language skills (literacy variable) and identity (identity variable) may independently influence specific types of behavior" (p. 23). He found that whether

mothers kept their children cleaner was associated with schooling through identity but not with literacy, whereas behaviors related to utilizing modern health care (such as communicating effectively with a doctor) are probably related to literacy and language use skills rather than identity.

Researchers (LeVine, et al, 1991, 1994a; Lindebaum, et al, 1989) hypothesized that one of the "identity" mechanisms that accounts for why mothers educated in school as girls have healthier children is that girls internalize an image of teachers which they then take on as mothers. They interact more verbally with their children, who in turn make greater time demands on mothers; these mothers then realize that children are very time-consuming and have fewer children as a result. Joshi (1994) did not find that maternal schooling was significantly associated with more verbal responsiveness to children, running counter to LeVine's findings, but he suggests that this may be due to constraints within Nepali culture discouraging women from talking too much, or that the society must be at a more advanced stage of the demographic transition (as it is in Mexico) for this effect to materialize.

LeVine, et al (1994a) offer a model of pathways from schooling to reduced mortality and fertility, where skills acquired in school increase women's exposure to mass media and then to better health behaviors, socioeconomic aspirations gained in school lead to higher-status marriage and then to access to better resources, and interpersonal behavior models acquired in school lead to different maternal behavior and then to more attentive child care and energy in child rearing. Based on this work, Comings, Smith and Shrestha (1994) developed a model of these mechanisms that includes other factors, such

as empowerment, leadership and group development, which may also mediate between education and impact on health. The model is presented in Figure 1:

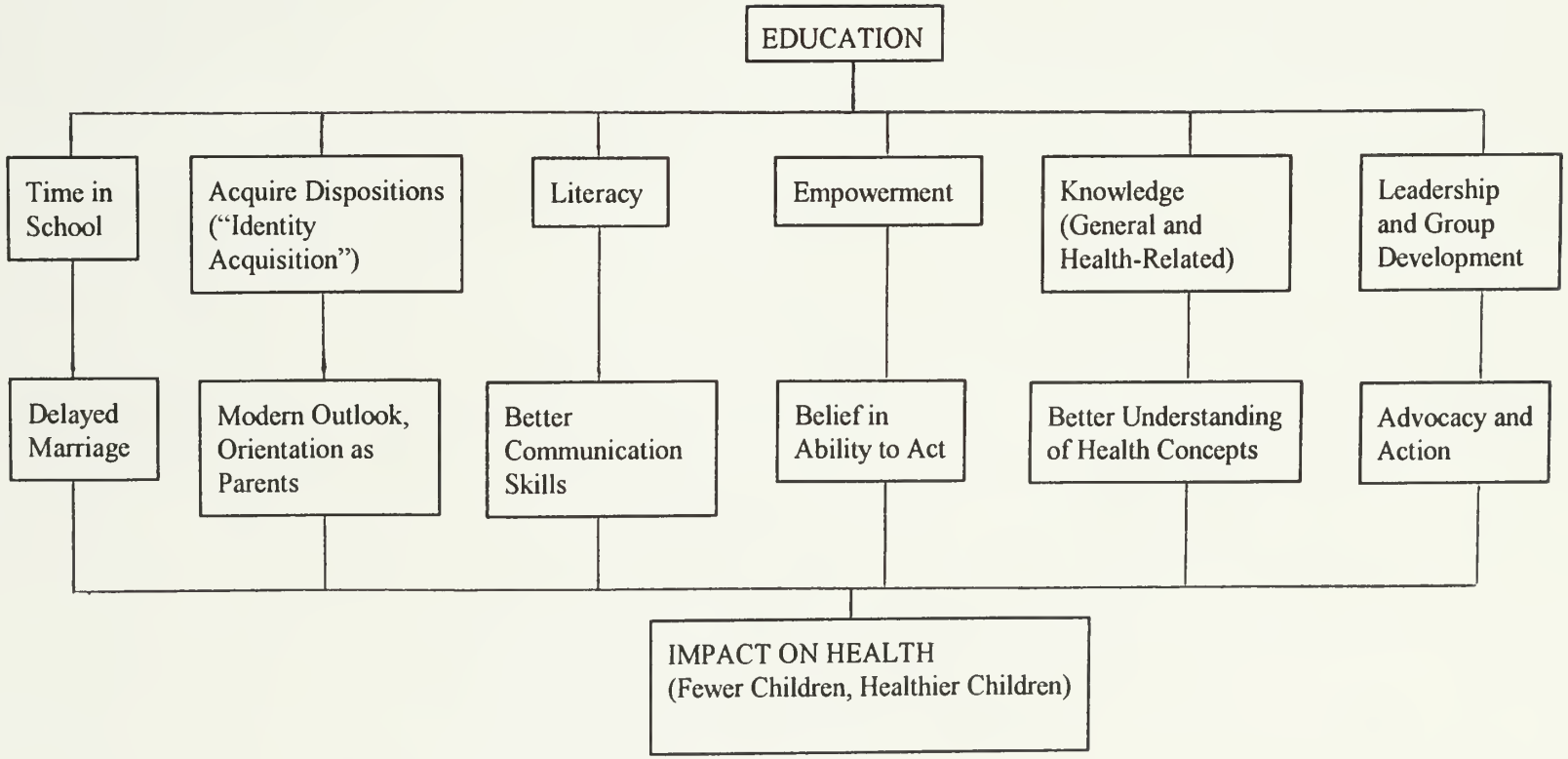

Figure 1. Model of Possible Mechanisms Mediating Between Women's Education and Improved Health
(From Comings, Smith and Shrestha, 1994)

Some of the mechanisms hypothesized in this model are related to schooling only (time in school, school-acquired dispositions), some are related to non-formal literacy acquisition only (specific types of knowledge, such as family planning, and group development), and some may be both (literacy, empowerment, leadership) in different manifestations. Comings, et al, believe that women's non-formal education should be included in any model of the effects of education since there are some mechanisms, such as group formation or knowledge of family planning, which may derive more (or differently) from non-formal education than from schooling.

Most of the research cited above uses the mother's level of schooling, rather than actual literacy skills, as the independent variable. The distinction between schooling and literacy is important if, as Levine (1982) points out, "there are massive differences between school literacy, which largely consists of academic exercises imposed on pupils as a curricular end in itself, and adult literacy, whose instrumental character naturally derives from its capacity to serve adult needs and projects" (p. 262). Therefore, it is not known whether it is mothers' literacy skills or schooling experience that positively affects children's health, although recent research by LeVine, et al, (1994b) indicates that it may be the level of literacy, more than the experience of schooling, that produces the effect, although there may be some underlying psychosocial or sociological factor, associated with literacy, that is the associated with this effect. The rationale for the special role of literacy itself as the predictor of positive outcomes and impact is that education makes a difference even in places where the quality of education is very low, suggesting that it must be something "general" about the educational experience that causes such a universal

impact. Stromquist (1991) proposes that the "general factor could be literacy", and that, as such, the effects of literacy acquired non-formally as an adult should be "akin" to those of schooling (p. 59). There is some evidence to suggest, and no evidence to refute, that social, economic and personal benefits can accrue when women become literate as adults. Bown (1990), in a review of 43 case studies of literacy projects that provided information about the effects of women's non-formal literacy acquisition, found that women's literacy, acquired as an adult, increased the likelihood of women using oral rehydration therapy and immunization services, and of adopting better nutritional and birth spacing practices. Non-schooled literate women demonstrated a greater capacity to participate in economic organizations and to mobilize credit, as well as an increase in self-confidence resulting in leadership, participation in community organizations, and increased readiness to influence decisions made in the family. In relation to family planning, she concludes that non-formal literacy programs for women...

> "...can have an immediate and sustained effect on women's opinions and behavior in matters which will determine family size (as well as possible access to schooling for those girls who would otherwise have been married off). Such women seem ready to take on received and previously accepted customs. It may well be that in many other places women are only accepting of cultural pressures against family planning because they have not had their awareness raised through literacy. Such evidence as we have suggests that it would be worth linking literacy with family planning" (p. 33)

While no solid, quantitative research has yet been conducted to confirm whether or not women's acquisition of literacy outside of school (either non-formally or informally)

has the same positive effect on fertility rates or children's health as does schooling, Bown claims that "what cases there are suggest that the same sort of effects could be expected where adult women become literate" (p. 30).

Status of Adult Literacy Programs for Women

If literacy is potentially so important to women's development and to the health and well-being of her family, one would assume that governments, in addition to trying to increase girls' access to education, would be spending sizable amounts on literacy programs for adult women. However, adult literacy programs are minimally funded compared to the funds allocated to formal school systems, even in the face of evidence about the extreme inefficiency of primary schooling. In Nepal, for example, even though only one-third of those starting primary school ever finish grade 5, and most of those who drop out do so in the first or second grade before they have a chance to acquire basic literacy skills (Williams and Ranjitkar, 1994), the government funding in 1994 for formal schooling at the primary level is 57.1% of the educational budget, as compared to the funding for adult education programs, which is .7% of the educational budget. The total education budget was 13% of the entire budget in 1994/95 (His Majesty's Government, 1994).

Why, then, are programs for women not offered on a more widespread basis? Abadzi (1994), in an overview of the obstacles to adult acquisition of literacy, argues that:

> "Governments and donors expect that their investments will provide permanent skills to illiterates and help alleviate poverty through reading of usable information...Experience shows that literacy is not easily

> disseminated to adults and that the skills of neoliterates are not stable. Dropout, mastery and retention rates are about 50 percent at each stage, so the effectiveness rate of some projects may only be 12 to 15 percent. As a result, literacy projects are now rarely funded by the World Bank despite requests from governments" (p. vii)

In a recent monograph on the rationale for and implementation of adult literacy programs, Comings, et al (1995), provide an explanation for the lack of confidence among funders and governments in the effectiveness of adult literacy programs. The main reasons are related to misperceptions about the **benefits** and **efficiency** of adult literacy. Research on the benefits of education (i.e., lower fertility, mortality and morbidity rates) has focused only on education through formal schooling, leading many to assume that adult education does not have the same positive impact. Research on efficiency has investigated literacy programs that were poorly-designed and under funded; finding high drop-out rates and low literacy skill acquisition, adult literacy is perceived as not being cost- or instructionally-effective in helping adults to reach and maintain the same levels of literacy that may be obtained in schools. Comings, et al, looked at the existing research and argued that adult literacy programs, adequately funded and well-designed, can be <u>as</u> effective at helping people acquire literacy skills and can be <u>more</u> cost-effective than schooling, an argument supported by Williams and Ranjitkar (1994), who found that in Nepal "literacy programs are cost effective when compared with three years of formal schooling, by a 4:1 ration." (p. iv)

However, funding for women's literacy may be on the increase, aided by an emphasis on improving girls' access to education. In April, 1996, the U.S. Agency for International Development initiated a five-year, $50 million project to support Girls' and

Women's Education. USAID is sponsoring this worldwide project based on their assertion that "female literacy and schooling have emerged as key variables in development gains in agriculture, family planning, child survival, environmental protection, and economic growth" (p. 2, New Activity Description, 1995). While the majority of funding in this grant is for girls' education, the goal of a "20 percent increase in female literacy rates in program areas through analytic studies and evaluations of pilot programs focused on women's literacy" indicates a commitment on the part of USAID to understanding and promoting women's literacy as part of their broader goal of contributing to "countries' social and economic development" (p. 21).

In the last five years in Nepal, donor support for women's literacy has increased dramatically. Women's literacy, through the "Women's Empowerment" objective, is a key component of one of the three strategic objectives under which the USAID/Nepal Mission has reorganized.[1] Women's literacy is also supported, via the Health Education and Adult Literacy (HEAL) program, by the health and family planning component of the USAID Mission in Nepal.

The interest expressed in Nepal by USAID is an example of the growing interest among those in the health and family planning field to support literacy as a mechanism for reaching health-related development goals. The strong, well-documented connection between education and lower mortality and fertility has increased the willingness of USAID/Washington and a number of USAID missions around the world to explore the possibility of integrating literacy into health education and primary health care efforts. For

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1 The other two strategic objectives focus on agriculture and health/family planning.

example, the AID-funded Family Planning Service Expansion and Technical Support (SEATS) project, implemented by John Snow, Inc., has a Women's Literacy Initiative, the goal of which is to "forge new and stronger links among women's literacy programs, the local and international agencies which sponsor them, and the international family planning community" (SEATS brochure, 1995). Since the overall goal of the SEATS project is "the rapid expansion of quality family planning and reproductive health services in undeserved populations", this is evidence of a commitment to implementing health projects that have literacy as a component.

However, although practitioners and policy makers in the health field are interested in long-term impact from women's education, they are also interested in immediate impact on children's health and family planning behavior. Since literacy education traditionally falls under the purview of educational ministries and organizations, the area of literacy education is new to health professionals. If women's acquisition of literacy through non-formal adult education has a positive effect on lowering rates of fertility, morbidity and mortality, then health educators and public health ministries in Third World countries should be interested to integrate literacy with their other educational efforts. The World Health Organization stresses that, because of the overwhelming evidence of the positive impact of mothers' education, there is a great need for "highly rewarding forms of intersectoral cooperation where health and education interact closely in methodology and content." (WHO Intersectoral Action for Health, 1986, p. 80).

Two questions arise in the minds of health policy makers: (1) Is investing in literacy likely to be successful in positively affecting health and fertility in the short and

long-term (as compared with the success of investing in girls' schooling)? and (2) If the health field is to participate in providing literacy education for the purposes of promoting health, how should adult literacy for women be organized and designed to have the greatest impact on health and fertility? The first question is beyond the scope of this dissertation, since it requires a longitudinal study comparing the health and fertility-related behaviors of groups of women educated non-formally as adults and groups of women schooled as girls. The second question is the focus of this dissertation.

Types of Non-formal Literacy and Health Education

Literacy Education

The difficulty of describing different non-formal education approaches stems from an overlap in the literature between the broad goals of different **strategies** for delivering non-formal literacy education to adults and the narrower learning goals inherent in the **instructional design approaches** used within these broad strategies. The discussion is complicated by a confusion between the goals of broad strategies and the philosophies of how adults learn that underpins the instructional approach chosen.

Comings, Smith and Shrestha (1995) define three approaches to adult literacy: (1) literacy campaigns, which attempt to serve as many illiterate adults within a specific period of time as possible, usually launched on a countrywide basis using volunteers; (2) literacy programs, which attempt to reach illiterates with a deeper level of literacy skill (usually equivalent to a third- or fourth-grade level) and which may continue over a decade or more; and (3) integrated literacy programs, which attempt to provide a more

comprehensive basic education to a smaller number of people, often based on a specific set of objectives such as health or income generation, with an eye towards having those participants act as leaders within their communities to encourage others to adopt innovations. Comings, et al, points out that a country might use all three of these approaches simultaneously or in succession.

In their overview of literacy "strategies", Lind and Johnston (1990) outline four approaches: (1) the Fundamental Education Approach (also called "basic education" or "general literacy"), which focuses primarily on the teaching of reading and writing skills, often within a vague framework of "community development"; (2) the Selective-Intensive Functional Approach, sometimes still called "functional literacy" or "economic literacy", which was initially launched through the Experimental World Literacy Program in 1967, and which focuses on teaching literacy skills within the "functional" content of vocational skills or work, usually agriculture; (3) the Conscientization Approach, an approach popularized by Paulo Freire that exists today under such terms as "participatory education" or "popular education", in which literacy is seen as a vehicle for helping rural villagers gain a critical conscious for understanding and taking action about the ways they are oppressed; and (4) the Mass Campaign Approach, which can be either "one-off" or "successive" in nature, in which countries promote a large-scale program to reach greater numbers of illiterates, often with the goal of political education; such campaigns require a great ideological commitment from the government. Lind and Johnston also describe, without calling it an "approach", the large-scale general literacy programs, which fall "between the active use of literacy for political change in campaign series and the active

use of literacy for purposes of economic growth/development in selective form" (p. 96). The Nepal National Literacy Program probably falls under this category.

Within these broad strategies, the many types of instructional design approaches often hinge on specific philosophies of how adults learn. The main differentiation in the literature is between, as Sjostrom and Sjostrom (1983) categorize it, "traditional literacy" --related only to the ability to read and write (similar to fundamental education)--and "modern literacy"--related to the practical ability to use reading and writing in daily life (similar to functional literacy). There are not many proponents of "traditional literacy", and most literacy programs or campaigns use materials that are "functional", related to issues and concerns illiterates face in their daily lives (Comings, et al, 1995). The prominence of "functionality" as a learning and instructional design approach is largely due to the massive evidence accumulated over the years that teaching reading and writing in its "pure" form, with no attempt to make the content relevant to the specific learners it is serving, is not interesting enough to rural villagers (who comprise the vast majority of illiterates) to keep them in such traditional programs, and because governments, funders, and literacy experts are primarily interested in literacy education that will serve as a vehicle for meeting broader development goals, and for helping adults "read the world" rather than just reading words. In the words of Welthy Fisher, founder of World Education, "I'm not just teaching people to read; I'm teaching them to read **something**." As far as governments and people are concerned, that **something** might just as well be about how to mix oral rehydration solution or fill out a loan application as it might be to read "see Dick and Jane run" or "b stands for bird". Adult education theory, as developed by

Knowles (1970) and Brundage and Mackeracher, 1980), supports this approach, espousing an approach to education for adults that is relevant, immediately useful and applicable, and based on active learning rather than on knowledge gained through text only.

The question, however, remains: if functional, "modern" literacy is preferable both to those who will fund it and those who will participate in it, what is the balance of content to skills in the instructional materials that is ideal for helping adults learn to read and write sufficiently well to keep their literacy skills over many years and to learn the knowledge and information they need to function as well as they'd like in their lives? The Experimental World Literacy Program strove to find a balance between the content of the development goal (in that case, vocation or work) and the reading and writing skills needed for applying that goal, and there is general disagreement about the extent to which integration of content and skills actually happened (Lind and Johnston, 1990) or was effective (UNESCO/UNDP, 1976). Although the term "functional" began with an emphasis on integrating one specific content (vocation, work, or employment) with reading and writing instruction, it broadened to encompass "life-orientated" skills until finally it has come to "justify everything and anything connected with basic skills education for adults" (Levine, 1982). The content of functional literacy material is often very broad, covering many different topics relevant to the adult learners' life (citizenship, environmental resource management, agriculture, health and social issues). Largely because of the broad nature of what "functional" now means to most educators and governments, the term "integrated literacy" is now starting to be used to refer to literacy

programs that use one particular content area (such as health or income generation) as a basis for instructional materials that teach basic reading and writing skills (Ballara, 1991). The instructional design of an integrated literacy program strives for an ideal balance of skills and content, while anchoring literacy education within a broader development program, such as health or micro-enterprise development. It is the integrated approach to literacy, specifically based on the content of health, that is the focus of this study, which seeks to answer the question: to what extent does an integrated approach to health/literacy help women acquire literacy skills and health knowledge, and is this approach any better than promoting health education or more general "functional" literacy programs separately? The implications of this finding should be of great interest in reducing potential duplications of effort in both literacy and health education programs, and maximizing the goals of each.

Health Education

Worldwide, women are the main care givers for children and other family members, and even though they may not make all the decisions about health care, they provide most of the preventive and curative care in the family (O'Connell, 1994; Smyke, 1991). This fact makes it essential that health care systems and health education reach women directly, a goal difficult to achieve when, in countries like Nepal, many rural women are illiterate and may have more difficulty than schooled women in understanding both written material and radio messages about health (LeVine, et al, 1994b).

One common type of health education--the use of villagers as volunteers who are trained as health promoters--tries to reach women directly. Community health volunteer programs are a key component of the "primary health care" effort that emerged from the Alma Ata Declaration of 1978 (WHO, 1988). Variously called Community Health Volunteers, Village Health Leaders, or Community Health Workers, their job is to provide simple curative and extensive preventive services and education in the community, usually related to immunization, oral rehydration therapy, and family planning. Oftentimes, they are provided with simple medicines (oral rehydration solution, aspirin, etc.) that they may either sell or give away to villagers. Community health volunteers are supposed to be selected by the community, paid either by the community or by the government, and trained by either a governmental or non-governmental training program. The requirements for serving as a community health worker, in most countries, include being literate, being able to travel to trainings and within the community, and being trusted and respected by community members.

Community health volunteer schemes have been well researched and documented in the literature. While the concept may seem sound, in reality there is often lack of support for CHVs to receive medicines and training, the training is insufficient or inappropriate, payment systems are inefficient, or CHVs claims that they don't receive respect from the community (Reis, et al, 1991). CHVs' sometimes demonstrate a lack of knowledge about health issues or an inability to convey information (Ryan, et al, 1991). One problem has been the inappropriate choice of the CHV from among all community members; specifically, since literacy is often a prerequisite for selection as a community

health volunteer, men (who worldwide are more often schooled than women) are often chosen (Bentley, 1989). In many cultures, this presents a cultural constraint on the transmission of specific health information (especially information related to family planning, pregnancy or children's health issues) from male CHVs to women or mothers in the community who are usually the primary caretakers and sometimes the health decision makers in the family.

There is some evidence to suggest that schooled literacy is not an appropriate criteria for CHV selection because schooled literacy per se does not necessarily add to the ability of CHVs to acquire, use and convey health knowledge. Ryan, et al (1991) found that among community health volunteers in Nigeria, tested five years after their initial training, those CHVs who had participated in adult basic education retained significantly more health knowledge than did CHVs who had gone to school or who had no education at all, prompting the authors to claim that:

> "The consistently good performance of primary health workers who had gained their basic education through adult literacy classes is a sign of personal motivation to learn even later in life. This motivation carries over to primary health care work." (p. 129)

Ryan, et al, also found that participation in adult basic education was positively correlated with activity levels of primary health care workers.

In addition to and oftentimes in conjunction with the work of Community Health Volunteers, there are two other strategies for promoting positive health behaviors in developing countries. The first is an approach known as Information, Education, and

Communication (IEC), often a component of family planning programs. IEC programs are designed to "create awareness, increase knowledge, build approval, and influence behavior" (Piotrow, et al, 1994). IEC programs focus heavily on interpersonal communications (direct contact between health service personnel and clients that includes a component of counseling) and mass media (information dissemination through television, radio, print, or cinema). The second strategy for promoting appropriate health practices, usually related to adoption of family planning methods, is called social marketing, "a strategy for translating scientific findings about health and nutrition into education and action programs adopted from methodologies of commercial marketing" (Manoff, 1985, p. 36). This approach uses the perspective that husbands and wives are clients or potential customers who need information about products, treatments or behaviors (such as birth control methods) in order to begin to use them.

Whether the non-formal approach for promoting health is through community health volunteers, IEC or social marketing, health educators and program planners need to consider how they will reach those potential "clients" for whom accessing print information is not an option, and reliance on more verbal interaction (through radio, television, cinema, village theater, or face-to-face discussions) is required.

Hypotheses Related to the Research Questions

If literacy education for women can lead to positive health outcomes, such as lower rates of fertility and mortality, then perhaps literacy programs for women which include content related to health will have even more positive outcomes. If this were true,

it would assist health promoters who want to use print to reach women with health education. However, the literature presents opposing hypotheses about whether integrated literacy is more or less effective in increasing adults' understanding of health concepts, and many hypotheses about the factors that may influence literacy skill and health knowledge acquisition in a context like Nepal are untested. This section presents a review of the hypotheses being investigated under each of the two main research questions in this study.

Hypotheses about Non-formal Education Program Design

The first main research question investigates the importance of non-formal education program design in women's acquisition of literacy skills and health knowledge, and there are three hypotheses to be tested in investigating this question. The first hypothesis being tested is that women participate in any type of non-formal health or literacy education will lead to greater literacy skill and health knowledge acquisition than women who do not participate in non-formal education at all. A review of seven evaluations of literacy programs conducted in Nepal between 1986 and 1990 confirms that participants do acquire literacy skills and functional knowledge, as evidenced on post-tests, but very few literacy programs are ever evaluated using either pre-tests or comparison groups (Comings, Shrestha and Smith, 1992). The inclusion of a comparison group in this exploratory study, even though there are selection problems and differences between the comparison group and the non-formal education groups, allows for testing

the hypothesis that participation will lead to greater skill and knowledge acquisition than non-participation.

The second hypotheses being tested is that women who participate in an integrated health/literacy program will acquire more literacy skills and health knowledge than women who attend a literacy program without health instruction or women who attend a health education program without literacy instruction. The existing knowledge base in this area is contradictory. On the one hand, the "rhetorical" literature includes a number of exhortations for connecting and integrating literacy education with specific content areas, including health as a content area (Chlebowska, 1990; Ballara, 1991; Hammad, et al, 1992). Stromquist (1991) argues that combining literacy with health knowledge or income generation may act as a powerful motivator for women to attend literacy programs, and she calls for research to determine if combining literacy with a functional area of knowledge increases women's motivation to join and persist in literacy programs among women. McSweeney and Freedman (1982) claim that women participating in a non-formal education program viewed the health-related activities as the most beneficial of the many activities offered, and that women would find time to participate in those activities, including functional literacy, that would improve their daily lives.

On the other hand, there is some argument by reputed literacy experts that integrating literacy with a specific content area will result in reduced literacy skills and knowledge acquisition. The evidence for this argument is stated by Lind and Johnston (1990) and Lind (1990), who warn against the "dilution of learning effects" (p. 10). Drawing upon a 1972 evaluation done of the Non-formal Education for Rural Women

program in Andhra Pradesh, India, Lind claims that combining literacy with instruction about mother/child health issues lead to less acquisition of health and literacy than did other programs with more singular goals. Specifically, the evaluation compared the literacy skills and "mother/child care abilities" of three groups of women: one group participated in a literacy program that used child health care issues as content, the second group participated in a health education program that contained information about and demonstrations on mother/child health care, and the third group participated in a program that was a combination of basic literacy classes and mother/child care education and demonstrations. According to Lind, the third group of women--those who participated in combined literacy and child care education--did not gain as much literacy as those women in the literacy program (Group 1) nor as much child care ability as those women in the health education program (Group 2). In essence, Lind is warning that acquisition of both skills and knowledge may suffer if the curriculum has two goals to accomplish in the same amount of time usually dedicated to one goal. This, then, represents the opposing hypothesis to the idea that integrating health with literacy instruction will help women to acquire skills and knowledge in both literacy and health. By comparing the differences in literacy skill and health knowledge acquisition between groups in this exploratory study, the hypothesis that women who participate in integrated health/literacy programs will acquire more literacy skills and health knowledge than women who participate in "health only" and "literacy only" programs can be tested.

The third hypothesis about program design to be tested is that women who attend a post-literacy/health course will acquire more literacy skills and health knowledge than

women who attend basic courses that teach these skills. The theoretical underpinning is based not only on a commonsense notion that increases in time spent in instruction will be associated with more skills and knowledge acquisition, but on evaluations in both formal settings (Fuller, Hua and Snyder, 1994) and non-formal settings (Comings, et al, 1992). Specifically, a UNICEF study conducted in 1989-90 and reported in Comings (1992) found that 76 percent of participants who completed a nine-month literacy course scored above 60 percent on a literacy test, compared to only 38.6 percent of participants who completed a six-month course. The inclusion in this exploratory study of 38 women who completed the HEAL post-literacy course permits testing the hypothesis that increased instruction time beyond the six-month course is associated with greater literacy skills and health knowledge acquisition.

Hypotheses about Factors Influencing Literacy Skill and Health Knowledge Acquisition

The hypotheses under consideration here are related to the second main research question, which concerns the factors that influence literacy skill and health knowledge acquisition, factors that might explain differences in literacy skills and health knowledge between groups. The four specific hypotheses to be tested include the individual, class-related, and community-related factors that may influence literacy skill and health knowledge acquisition.

The first hypothesis tested as part of this research question is that individual factors may influence literacy skill and/or health knowledge acquisition. There are a number of particular factors to be considered as part of this hypothesis, including subjects'

age, marital status, caste, first language, number of children, radio ownership, hours of instruction, distance to class, distance to health post, and distance to road. The specific hypotheses related to each of these factors is presented below.

Age. This hypothesis is that age learning, such that women who are older will have a more difficult time acquiring literacy skills and health knowledge. Abadzi (1994) proposes this hypothesis based on a review of the literature on first and second language literacy learning, although she points out that age may interact with other variables (such as physical health, parental education, and opportunities to use literacy outside of class) that magnify the learning difficulties of older participants. Manandhar (1989) found that age was negatively related to performance on a literacy test among 101 participants in a Nepal literacy programs.

Marital status. Manandhar (1989) also found that married women demonstrated weaker literacy skills than their unmarried counterparts (although the difference was not tested for statistical significance). The reasons for this are not discussed, but it may be that married women have more difficulty attending class regularly due to heavy workloads and families at home. Whether married women have higher levels of health knowledge, particularly related to family planning concepts, is not known. It is unclear how marital status is related to literacy skill and/or health knowledge acquisition; therefore, the null hypothesis can be tested that marital status does not influence literacy skill and/or health knowledge acquisition.

Number of children. There are two opposing hypotheses to consider in relation to number of children. First, Manandhar (1989) found that the number and age of children a

woman had was negatively related to her literacy achievement (although, again, this was not subjected to statistical tests). The reasoning is that women with more children are busier at home, making it harder for them to attend class regularly, or that women with younger children often bring them to class, reducing their ability to concentrate on literacy skill practice. In relation to health, however, one would assume that women with children may be able to acquire greater health knowledge than their childless counterparts, simply due to their need for information about children's health or from their exposure to health information received in the course of caring for their children's health by talking with health service personnel or other mothers. The hypothesis being tested, then, is that number of children a woman has influences her acquisition of literacy skills and health knowledge, such that she may gain fewer literacy skills but more health knowledge.

Caste. Traditionally, some castes in Nepal put a higher premium on education; Brahmins, for example, have a long-standing tradition within the priesthood and as the most educated of the Hindu castes. Therefore, one hypothesis to test is that caste is an important factor in literacy skill and health knowledge acquisition, such that "higher" castes (Brahmin/Chhetri) acquire more skills and knowledge due to a traditional cultural emphasis and support for education.

First language. Wagner (1990) points out that the debate still continues over whether it is more difficult for adults to learn to read in a language that is not their mother tongue. On the basis of a study of 97 adults from different districts in Nepal who had participated in literacy classes, Manandhar (1993) recommends that different versions of the basic literacy primer be developed in other languages, to make it easier for learners

whose mother tongue is not Nepali. There is, however, some evidence to suggest that learning to read in a second or third language is not a barrier where the learner's motivation to learn the language of instruction if high (Wagner, Spratt and Ezzaki, 1989; Comings, Shrestha and Smith, 1992; Sjostrom and Sjostrom, 1982). The specific hypothesis to be tested in this exploratory study is whether the learner's first language influences her ability to acquire literacy skills; however, the data set does not provide information about whether and how well subjects also speak Nepali if they did not identify Nepali as their first language. The question of whether first language affects health knowledge acquisition is unknown. Therefore, the null hypothesis to be tested is that first language does not influence literacy skill and health knowledge acquisition.

Radio ownership. In a review of research on the retention of literacy skills over time, Comings (1995) found that exposure to radio was associated with improved reading comprehension and retention of literacy skills. Piotrow, et al, (1994) report that exposure to radio and mass media campaigns "can influence not only family planning knowledge and attitudes, but also behavior" (p. 16). Previous or simultaneous exposure to health messages via the radio may teach or reinforce concepts learned through non-formal education. Therefore, this study will test the hypothesis that radio ownership positively influences literacy skill and health knowledge acquisition; however, the extent to which radio ownership is a true proxy for "exposure to radio" is unclear (since owning a radio does not necessarily mean listening to one). It is also possible that radio ownership is a proxy for, or highly related to, economic status, since in Nepal purchasing a radio is possible for those households at income levels that can afford such a "luxury".

Hours of instruction. This hypothesis is simply that total hours of instruction an individual women receives through her participation in non-formal education is an important factor in the level of literacy skills and health knowledge she acquires. The rationale for this hypothesis was discussed above in relation to the hypothesis in the first research question that greater literacy skills and health knowledge acquisition are related to participation in a post-literacy program.

Distance to class, health post and road. Many women in Nepal live in remote villages far from roads and from services such as health posts and hospitals. In very hilly areas, women may also live in houses many minutes walk from neighbors, from the center of the village, or from the literacy class site. The hypothesis in question here is that living further from the non-formal education class, further from the road, and further from the health post will influence individual women's acquisition of literacy skills and health knowledge.

The second hypothesis under this research question relates to the factor of overall learning. It is reasonable to assume that subjects who acquire more literacy skills will acquire more health knowledge, and those that acquire more health knowledge will acquire more literacy skills. In other words, this hypothesis posits that some participants in non-formal education programs are better learners overall. Recent research by LeVine, et al (1994a, 1994b), seems to indicate that women with greater levels of education also demonstrate better comprehension of oral health messages, but no substantive research has been done connecting literacy skills per se with knowledge acquisition. This exploratory study will test the hypothesis that literacy skill acquisition is associated with

health knowledge acquisition by testing the association between skills and knowledge within and between subjects.

The third hypothesis is that class-related factors may influence literacy skill and/or health knowledge acquisition. Class-related factors investigated in this study include facilitator gender and educational level, class facilities such as presence of blackboards and benches, availability of light, time of class, dropout rate, number of times the class was supervised, and location of class, among others. Studies of both formal schooling (Fuller, et al, 1994; Warwick and Jatoi, 1994) and non-formal literacy classes (Mwiria, 1993; Carron, et al, 1989) investigating the impact of factors such as classroom facilities and teacher characteristics or teacher gender have found that these are important to student achievement. Comings, et al (1992), in their review of literacy evaluation studies in Nepal, that teacher selection, training, and supervision can significantly lower drop-out rates. Through the data in this set, the hypothesis above can be tested through a qualitative analysis of the relationship between these class-related factors, across sites, and the acquisition of literacy skills and health knowledge.

The fourth hypothesis is that community-related factors may influence literacy skill and/or health knowledge acquisition. Data on community factors available in this data set include remoteness and size of the research site villages, ethnic composition and predominant language, availability of water and electricity, presence of latrines, presence of a non-formal education committee, and economic status of the community. The literature is clear on the barriers facing women's participation in literacy classes, many of which relate to the lack of time women have to study because their workload (carrying

water, collecting fuel) is so heavy (Chlebowska, 1990; Lind and Johnston, 1990; McSweeney and Freedman, 1982). Therefore, one would assume that in villages without water and electricity, or where economic conditions are harsher, women will find it harder to attend classes consistently, thereby reducing the likelihood that they will acquire greater literacy skills and health knowledge. In addition, villages that are more remote may have less contact with health service personnel (Chalker, et al, 1990), and this may influence the level of health knowledge existing in the community. Although the information on community-related factors is inconsistent for the research sites in this exploratory study, the data does provide some basis for testing the hypothesis that community-related factors influence literacy skill and health knowledge acquisition in the different sites.

Research Context

Nepal is a good context for studying the question of the effectiveness of integrated literacy and health education because there exist, simultaneously, at least three types of non-formal education related to health and/or literacy: a program that provides integrated health and literacy instruction; a program that provides functional literacy instruction without added health education; and a program that provides health education without literacy instruction. In this section, I will review the context for this study in Nepal, including the status of women and their role in family health care and family life, the status of female education, the status of health and fertility, and the system for health care and health education in the country, including the female community health volunteer program. This section will also provide an overview of the different types of non-formal education

programs (CHV-based health education, basic functional literacy education course, and Health Education and Adult Literacy course) that are being explored in this dissertation.

Status and Role of Women in Nepal

Women in Nepal live in one of the poorest countries in the world. The GNP per capita is $170 per year, as of 1992 (World Bank Development Report, 1994), and it ranks 149 out of 173 countries on the Human Development Index used by the World Bank. Life expectancy for women is 56 years, compared to 57 for men; although women in a few other countries have a lower life expectancy rate, Nepal is only one of three out of 126 developing countries[2] in Africa, Asia, Latin America, and the Middle East where women's life expectancy rate is lower than men's (United Nations Population Prospects, 1992). Girls marry very young and move to their husband's village and household; the mean age at marriage in 1994 was 18 years, an increase from 15.4 years in 1961. Median age of marriage among all women in Nepal is 16.4 years, with rural women marrying earlier (16.3) and urban women marrying later (17.3) than the average (Acharya, 1994); thus, half of the women in Nepal are married at or below age 16.

Women's status is very low compared to men's. Men (and sometimes other members of the husband's household, including mothers-in-law) have control over many areas of women's lives, including control over women's educational opportunities, women's productivity, women's reproductive power, women's mobility, women's right to

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2 According to Population Prospects in 1992, the other two countries are Maldives and Pakistan. World Development Report in 1994 states that Bangladesh is also a country where women's life expectancy is lower than men's.

property, women's use of resources, and women's decision-making power within the household (Subedi, 1993). Women work longer hours than men in both productive and household chores, often rising well before dawn and retiring after all others in the household have gone to bed. In the words of one female literacy class participant who was encouraging other women to join the class:

> "In this village, we have a saying--'we just eat and we work'. So I tried to get the women to come, and they would say, we have no time. And I would tell them that the only time that we will ever have to rest is when we are dead. The class is only two hours a day, so they should come now..." (Smith, 1994, p. 33).

Female Education in Nepal

According to the Nepal census, overall literacy has increased from 13.9 percent in 1971, and 23.3 percent in 1981 to 39.3 percent in 1991, although the female literacy rate, at 24.7 percent, is much lower than the literacy rate for men (Acharya, 1994). Other sources report much lower literacy rates: 41% for males and 14% for females (UNESCO Division of Statistics, 1994/95). While the illiteracy rate for males is declining, the illiteracy rate for females is still climbing and will continue to do so until well into the next century (Shrestha, World Bank Report, 1993). This is because, in Nepal, "for every 100 boys, only 53 girls receive primary school education" (Acharya, 1994); UNESCO reports that the net enrollment rate at the primary level is 80% for boys and 44% for girls.

The barriers to schooling girls in Nepal are the same as in many developing countries: "Poverty, workload, and cultural perceptions remain the major factors hindering female education." (Acharya, 1994). Girls, from a very young age, contribute a major

share of productive work to poor, rural households, so the opportunity costs of sending girls to school are very high for families who depend on girls to take care of younger siblings, fetch water, fodder and fuel, and tend livestock (Hill and King, 1993). The opportunity costs of investing in girls' schooling are much higher than investing in boys' schooling, since girls typically work more hours per day than boys. In Nepal, "girls of rural communities between the ages of 10 and 14 work an average 7.31 hours a day while boys of the same age group work only 4.5 hours." (Subedi, 1993, p. 91) If a family can only afford the costs of sending some of their children to school, it is much more likely that sons rather than daughters will attend, and if a family with all children attending school runs into hard times, it will be the girl who drops out. Acharya (1994) cites Nepal statistics showing that as income level rises, more girls go to primary school. There is also an interaction between poverty and culture in patriarchal societies like Nepal where investing in girls' education has a less immediate payback than does investing in boys' education, since girls traditionally marry and move to their husband's household. As a Nepali saying goes, "a daughter is meant for painting the walls of somebody else's house", so many parents believe that investing in years of a daughter's schooling is a contribution of resources to someone else's household. There is also a fear that a girl's purity will be compromised through contact with fellow students or male teachers. Since schools in Nepal are often situated many hours walk from the house, parents are afraid for their daughters' safety. Even the perception by potential in-laws that attending school may have damaged a girl's purity is enough to prevent many parents from sending their daughters to school, fearing that the hint of a spoiled reputation will make the girl

unmarriageable. Finally, the cultural tradition of marrying girls very young means that a girl's schooling will be interrupted at the age of 13, 14, 15 or 16 in order to take up residence in her new husband's village upon marriage.

Efforts are being made in Nepal to increase girls' participation in schooling; King and Hill (1991) report a teacher training program in the 1970s and early 1980s that trained rural girls, whether or not they had passed the School Leaving Certificate test, to become primary school teachers, thereby increasing the number of women in the rural teaching force, an intervention that may have encouraged more girls to attend or persist in school. Nepal has been identified as one of the "cooperating countries" that will be involved in the new five-year, $50 million USAID-funded Girls' and Women's Education project. Private agencies, such as international non-governmental organizations, are also involved in piloting efforts to increase girls' access to schooling, such as the Girls' Scholarship program run by the Asia Foundation. As opportunities for girls to attend schooling slowly increase, there are other opportunities for girls and women to acquire a basic education outside of school. The government's Basic and Primary Education Program (BPEP) sponsors out-of-school non-formal education classes for girls, and both non-governmental agencies (NGOs) and the government sponsor out-of-school classes, in which a large percentage of the participants are girls.

There is also a National Literacy Program that provides six-month adult literacy classes in rural areas, and approximately 70% of the participants in these classes are women (Comings, Smith and Shrestha, 1995). Currently, these classes are funded by international donors such as USAID and UNICEF, and by His Majesty's Government of

Nepal through the Ministry of Education and through quasi-government organizations such as the Basic and Primary Education Project, Production Credit for Rural Women, and the Small Farmers' Development Program. The Ministry of Education has increased its financial commitment to adult literacy through the National Literacy Program in recent years, and USAID continues to be one of the biggest funders of women's literacy. Classes are implemented by the Ministry of Education and by international non-governmental organizations such as Save the Children, Private Agencies Collaborating Together, World Education, and World Neighbors, and over 150 non-governmental organizations (Williams and Ranjitkar, 1994), such as the Nepal Women's Organization and Family Planning Association of Nepal. In 1995, it was estimated that the National Literacy Program served approximately 500,000 illiterate adults, most of whom were women. This six-month course runs from November through May, using a two-book series entitled "Naya Goreto" (The New Trail); classes meet six days a week for two hours a day, for a total of approximately 300 hours of instruction. The materials include discussion posters, comics, games, and exercises. The course includes basic reading, writing, and math instruction, using a variety of topics relevant to rural villagers: reforestation, sanitation, health, family planning, agriculture, and social issues such as domestic violence and corruption. The teaching methodology is designed to be participatory and to encourage learners in the class to discuss critical issues together and teach each other in small and large groups. Approximately 25-30 participants form a class in an area selected by the NGO or the Ministry based on need. A local person with basic literacy skills is recruited and trained to

serve as the class facilitator, and a supervisor is trained to visit and supervise the classes twice a month.

The Ministry maintains that completion of the six-month course provides those who pass the final test with the equivalent of third-grade reading and writing skills. In some areas, government organizations and NGOs are offering a nine-month course of literacy instruction (six months of basic instruction followed by a three-month post-literacy course). A recent evaluation by World Education in sixteen sites run by 6 different organizations (Ministry of Education, Basic Primary Education Program, Save the Children Fund, Production Credit for Rural Women, Small Farmers' Development Program, and World Education) indicated that the drop-out rate from these classes ranges from 6% to 52%, with an overall drop-out rate of 24% (Smith, Comings and Shrestha, 1995).

Health and Fertility in Nepal

The most up-to-date statistical information about the status of women and children's health and fertility in Nepal is provided by Meena Acharya (1994), who took Nepal census data from 1971, 1981 and 1991, along with all information from other surveys conducted in recent years by local and international organizations, and compiled them in "The Statistical Profile on Nepalese Women". Total fertility rate (TFR) has declined only marginally, from 6.3 to 5.7 children per woman (in the child-bearing ages), from 1971 to 1991, even though awareness about family planning methods is high and significant resources have been spent on family planning programs in those 20 years.

Total Fertility Rate has actually increased slightly among the 15-29 age group, even though girls are marrying later and schooling within this group has increased. Women without a primary education have as many as 1.4 more children than do women who completed primary school. The census also shows that urban women have fewer children (5.3) than do rural women (6.2). Knowledge of family planning has increased dramatically: in 1976, only 21.3 percent of women claimed to know of one family planning method, whereas in 1991, 92.7 percent of women could name one method. Use of family planning has increased from 3.9 to 24.1 percent, demonstrating the gap between knowledge and use.

According to the 1991 Survey on Fertility, Family Planning and Health (NFHS), reported in Acharya (1994), infant mortality rates (IMR) are still among the highest in the world: 98 per thousand births (104.7 for males, 91 for females). This is a decrease from 132.5 in 1976. The rate of child survival has improved from only 72.7 percent of children born to 82.9 percent in 1991. The Under Five Mortality Rate in Nepal is 125 out of 1000 for boys, 139 per thousand for girls, one of the highest rates in South Asia (World Bank World Development Report, 1993, reported in Acharya, 1994). The maternal mortality rate is the highest in the region: 850 maternal deaths per 100,000 live births. According to a 1990 UNICEF report (reported in Acharya), 50% of people are malnourished, 78% are anemic, 2.1% suffer from Vitamin A deficiency, and 40% suffer from iodine deficiency. Only 35% of rural villagers have access to safe drinking water, and only 3% of the rural population has access to a latrine. There are approximately 4,700 hospital beds in the country, 2.4 hospital beds for every 10,000 people (Dixit, 1995), one of the lowest

ratios in South Asia. As of 1990, there were 16,670 people for every doctor (World Bank Statistics, 1994). About 60% of Nepal's physicians live in the Kathmandu Valley (Puretz, 1989).

Health Care and Education in Nepal

There are three formal sources of health care in Nepal: the health service system, the traditional faith healers ("dhami/jhankris"), and the private sector (pharmacies and private doctors). The health service system comprises a hierarchy of health educators and medical personnel, from the local Community Health Volunteer to the District Public Health Officer. In 1994/95, the Department of Health Services in the Ministry of Health reported that there were 74 public hospitals, 78 Primary Health Centers, 775 health posts, and 1,968 sub-health posts in the 75 districts across Nepal. Health posts and sub-health posts are situated in each "ilaka" (health post catchment area), staffed with a range of health care workers, including the Health-Post-In-Charge, the Auxiliary Nurse-Midwife, the Maternal and Child Health Worker, and the Village Health Worker, whose job it is to travel from village to village in the ilaka to provide vaccinations, simple treatments such as oral rehydration therapy, and health education about family planning. In many cases, however, the peon at the health post actually provides much of the treatment, from dressing wounds, dispensing medicines, and giving injections, even though he usually has no medical training whatsoever (Justice, 1983, reported in Dixit, 1995). At the village level, there are 11,500 Traditional Birth Attendants and 36,450 Female Community Health Volunteers who provide health education through mothers' groups. Health posts

generally charge a fee for services, while the services of Village Health Workers, Traditional Birth Attendants and Community Health Volunteers are either free or paid "in kind" through gifts of food or other goods. Because there are far fewer health posts than there are villages in the hills and mountains of Nepal, villagers must often walk from 2 to 5 hours to get to a health post.

Faith healers (numbering about 400,000, or one for every 40 people) provide local treatment for illnesses and are often paid a minimal fee (5-10 rupees, or approximately 20 cents) or paid in kind (Puretz, 1989). Many Nepalis first seek treatment from "dhami/jhankris", either because of their belief in the efficacy of the faith healer for treating certain types of illnesses, or because the health post is perceived to be too far away, too costly, too poorly staffed, or the availability of medicine and treatment considered to be too haphazard, and this results in health posts and hospitals being a "last resort" recourse in cases of serious illness (Dixit, 1995). Dhamis are also more familiar to villagers, since they live in the local area, and can be paid in kind when families have no cash on hand. In addition, the patient does not have to travel as far for treatment, and dhamis often come directly to the home (Chalker, Dapali, and Khadka, 1990).

The private sector, operating mostly in more urban areas, consists of private doctors providing treatment for a fee. These doctors tend to be too costly for most rural Nepalis and are used mostly by more middle-class people who live in Kathmandu or the larger cities. Pharmacies operate throughout the country in larger villages and district centers, selling both homeopathic and mainstream medications, and pharmacists are often consulted as if they were doctors. In some cases, social marketing family planning

programs are now training pharmacists in how to administer Norplant and Depo Provera birth control methods.

There is also a vast array of international governmental and non-governmental organizations such as UNICEF, USAID, Red Cross, Save the Children, John Snow, Inc., and Center for Population and Development Activities, running largely preventive, infrastructural and educational programs aimed at improving the long-term health status of Nepalis. Some of these programs do provide preventive treatment, such as the Vitamin A program sponsored by USAID, which provides doses of Vitamin A to children in particular districts where Vitamin A consumption is low and large numbers of "night blindness" cases result.

In order to increase the quality of primary health care in Nepal, a community worker health program was established in the late 1970s, following the 1978 Alma Ata declaration promoting primary health care as the solution to the health crisis in developing countries. The Female Community Health Volunteer (FCHV) program began in 1988, evolving from the Community Health Leader (CHL) program which started in the early 1980s. The Community Health Leader program was designed to train a local villager, almost always a man, to provide basic health education and simple medical treatments right in the community. However, the program was lacking in community participation, effective supervision by Village Health Workers, motivation in the absence of financial support or recognition, and involvement of women. As a way to address these problems, the Female Community Health Volunteer program was begun. The overall goal of the FCHV program, as stated in the 1996 Annual Report of the Nepali government's

Department of Health Services, is to "reduce the child and women-related health problems (maternal mortality rate/infant mortality rate) through active participation of trained women volunteers." (p. 106) Specifically, FCHVs are to give rural women a basic knowledge of health care, enhance self-help in the community, and promote community participation in and awareness of public health issues. FCHVs meet these objectives through formation of local mothers' groups that meet once a month for several hours. In these meetings, the FCHV is to provide information about three main topics: immunization, family planning, and oral rehydration. They may also provide information about sanitation and hygiene, nutrition, or other health issues as well as information about government health services such as immunization clinics and the health post. FCHVs have a small stock of medical supplies, such as oral rehydration solution, condoms, and simple drugs that they sell in the community. They are also asked to keep simple tallies of births, deaths and illnesses in the village. FCHVs are purportedly chosen by the mothers' group itself, after an orientation to the community about the program; the FCHV should be over 25 years of age, married and willing to volunteer in their communities, but it doesn't matter if they know how to read and write. They attend a twelve-day training designed to teach basic health concepts to women without literacy skills, and annual in-service trainings are organized by the Ministry of Health. Before 1990, FCHVs were given a 100 rupee per month honorarium (about $4), as a recognition of their time and effort.

Early reviews (McConnell and Taylor, 1989) indicated that the CHV program was working better than the old CHL program but still suffered from supervision and resupply problems. However, the following year, the government decided to terminate the

honorarium, making the FCHVs true "volunteers". An evaluation by John Snow, Inc, an international non-governmental organization supporting the program with funding from USAID, indicated that without the honorarium many FCHVs had stopped serving. However, many others continued on, even without the money; the evaluation showed that FCHVs felt they would be willing to continue to serve as volunteers if they had two things: (1) literacy skills for themselves and for the women with whom they worked, and (2) recognition and gratitude from the community about their service. The literacy skills were seen by the FCHVs as necessary for them to do their job effectively and as crucial for women to better understand and use the health information they were receiving.

In response to this, John Snow, Inc. and World Education (an international NGO supporting innovative adult literacy programs in Nepal), with USAID funding, initiated the Health Education and Adult Literacy (HEAL) program in 1991. The objectives of the pilot program were to: (1) increase the literacy skills and health knowledge of female CHVs and village women; (2) increase the commitment and effectiveness of CHVs by increasing the community's recognition of them; (3) increase women's understanding and use of health services; and (4) provide a viable project model that could be expanded to other areas (Smith, 1994). By using the existing National Literacy Program six-month course as a foundation, the HEAL project provided health and literacy education to illiterate FCHVs and the mothers with whom they worked, as a class, in three phases: Phase 1 is a six-month course that uses the existing National Literacy Program's basic six-month course materials, which cover a range of topics such as agriculture, reforestation, health and social issues, with the addition of twelve new 45-minutes lessons on specific

health topics, such as Vitamin A, immunization, tetanus, family planning methods, breast feeding, malnutrition, oral rehydration, birth spacing, and prenatal care, developed by the HEAL project. The course is taught by a locally-recruited and trained facilitator; the supervisor for the course teaches the supplementary health lessons during his twice-a-month visits. Phase 2 is a three-month post-literacy course using a newly-designed book for the HEAL project that includes 25 lessons focusing solely on health topics including nutrition, sanitation, AIDS, family planning and birth spacing, first aid, fever, and intestinal worms. The book includes exercises to enhance reading, writing and math skills and teaches women to use weights, measures, and calendars. The same local facilitator and supervisor teach and supervise the class. Phase 3 is a 12-month continuing education course, utilizing 12 once-a-month booklets on health issues, designed to be used during the monthly mothers' group meetings run by the female Community Health Volunteer (CHV). The health topics include sanitation, latrines, pneumonia, health post services, the role of the CHV, Vitamin A, family planning, the role of the Village Health Worker, health hazards of alcohol and smoking, community participation, nutritious food, and prenatal care. The use of the continuing education booklets is guided by the CHV during the once-a-month mothers' group meetings; there is no other facilitator for this phase. The two-year HEAL pilot program was conducted in 77 villages in Makwanpur district in central Nepal, and almost 2000 women participated in the project.

An evaluation of the HEAL pilot program indicated that the health/literacy course was well received by FCHVs, women participants and health service staff, who saw it as an aid to their health education work in the villages (Smith, 1994). The intention of the

HEAL pilot program was that it would later be implemented as an intersectoral program by the Ministries of Health and Education, both of whom were involved in the pilot. However, due to political and government changes during and after the pilot program, there was little confidence among funders that these Ministries would be capable of implementing the HEAL program on a larger scale. Currently, USAID is funding a moderate expansion of the HEAL program, through funding to World Education, the Center for Education, Development and Population Activities (CEDPA), and the Asia Foundation, who fund local Nepali NGOs already using basic literacy as part of their health and family planning promotion efforts. In this two-year expansion (1995-1997), over 13,000 women in 7 districts will have had an opportunity to participate in the post-literacy and continuing education phases of the HEAL program.

Overview of Health and Literacy Projects Being Studied

The three programs for women being studied in this dissertation have already been mentioned in the descriptions of literacy and health education in Nepal above. The first program offers health education provided by female Community Health Volunteers through monthly mothers' group meetings and informal contact between CHVs and women in the village. In this study, women and CHVs living in Makwanpur district, in the central district of Nepal, were studied. The women working with these CHVs received "health education only", although some of the women had previously attended either school or a basic literacy course.

The second program is the six-month basic literacy course run under the National Literacy Program, implemented by the Production Credit for Rural Women (PCRW) project in Ilam district, in the far east of the country. The women participating in this program received "functional literacy only", without any additional or supplementary health education beyond that which appears in the literacy course materials.

The third program is the Health Education and Adult Literacy (HEAL) program, implemented by World Education (an international non-governmental organization). The HEAL course offers a nine-month course of literacy specifically oriented towards health; three sites in Makwanpur district, where the HEAL literacy classes (both basic and post-literacy) were run, are included in this study. The women in these sites received the integrated "health/literacy" education through Phase 1 (the basic literacy course plus supplementary health lessons) and Phase 2 (the three-month post-literacy course on health); this study does not look at women completing Phase 3 (the 12-month continuing education phase) because it was not completed in these sites at the time of data collection.

A fourth group of women is included in the study: a group of 25 women from Ilam district and 25 women from Makwanpur district who, as far as is known from the data set, participated in no non-formal health or literacy program previously.

Figure 2 on the following page shows a map outlining the position of the two study districts--Makwanpur and Ilam.

Figure 2. Map of Nepal

(From Nepal Report 1990. Kathmandu, Nepal: UNICEF, October, 1990.)

CHAPTER 3

RESEARCH METHODOLOGY

Design

This dissertation is an exploratory study comparing three different approaches to non-formal education. It makes use of both quantitative and qualitative data from an existing data set, developed by World Education as part of a larger research and evaluation effort that took place between 1993 and 1995. The information in the data set includes demographic data, class and community context data, literacy scores and health knowledge scores for 252 subjects in four different groups of subjects: (1) those who were exposed to a Community Health Volunteer-lead non-formal education program, (2) those who attended a basic literacy non-formal education course, (3) those who attended an integrated health/literacy course (basic course and post-literacy course), and (4) those who had attended no non-formal education program at all.

Setting and Group Selection

There are three non-formal health and/or literacy education projects included in this study. The first is the Community Health Volunteer (CHV) program in which illiterate female villagers are trained to serve as a health education resource for women in the village by conducting monthly 2-hour Mothers' Group meetings on health topics such as immunization, oral rehydration, and family planning. This program is implemented by the Ministry of Health, with technical assistance from an international NGO, John Snow,

Inc. The women who attend these monthly Mothers' Group meetings thus represent women who have been exposed to health education without a literacy component. In this group (Group 1) are 74 women from 3 different sites in Makwanpur district. Each site is a village where a female CHV has been working with women who are members of the village Mothers' Group, lead by the CHV: Basamadi village, with 25 women subjects; Churiyamai village, with 22 women subjects; and Hatiya village, with 27 women subjects. The sites were selected by working with a British health volunteer who was aware of all of the CHVs in Makwanpur. These three sites were chosen because the British volunteer knew that two of them (Basamadi and Hatiya) had active CHVs (where the CHVs had been actively conducting groups and education over the last 12 months) and one of them (Churiyamai) had an inactive CHV. Makwanpur District--the same district in which the health/literacy project was conducted--was chosen as the area to select these "health only" sites in an effort to keep other factors (such as geography, ethnic composition, socio-economic factors) constant. The women in Group 1 were interviewed and tested one time only in November 1994. Based on the information in the data set, it is apparent that a literacy class run by another organization was conducted in one of the CHV-lead (Group 1) sites in the past, and while there is information in the data set about which of the subjects attended a previous literacy class, there is no information about when that literacy class was run or how many hours of instruction each woman received. However, the available information about previous literacy class attendance in this group does provide the opportunity for comparing the impact of yet another literacy class on the level of literacy skills in this site.

The second non-formal education project is the National Literacy Program, which provides a basic six-month literacy course. At the time of this research, the basic literacy course then used a 4-book set of materials containing development themes such as reforestation, agriculture, family planning, nutrition, and latrine construction.[1] In this program, health is presented as one of many development themes. The National Literacy Program as a whole is conducted by the Ministry of Education and Culture, but fully 60% of the classes are run by international and national NGOs like Save the Children, UNICEF, Small Farmer's Development Program, United Mission to Nepal, and Production Credit for Rural Women. Women who participate in these basic literacy courses thus receive literacy education without a specific focus on health. This second sample group (Group 2) consists of 38 women from two classes who completed the basic literacy course run by the Production Credit for Rural Women (PCRW) project in Ilam district. PCRW literacy course participants in Group 2 were tested and interviewed in June 1993, just at the end of the six-month literacy course.

The third non-formal education project was a pilot program which sought to integrate health education with literacy education. The project, entitled Health Education and Adult Literacy (HEAL), was specifically designed for illiterate CHVs and village women. It used the same 4-book set of materials used in the National Literacy Program, with the addition of twelve 45-minute health-related lessons taught twice a month throughout the basic literacy course. These lessons contain specific information about

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1 The four-book set has since been revised into a two-book set containing the same amount of information.

immunization, birth spacing, treatment of diarrhea, family planning methods, and prenatal care. The participants in these non-formal classes are the female CHVs in each village and the Mothers' Group members with whom they work. Women who participated in the HEAL project thus received both literacy and health education. The HEAL project also offers a 3-month post-literacy course built solely around health content. This "health and literacy" group of women (Group 3) consists of a sample of 65 women from 3 different classes who completed the HEAL literacy/health six-month course, and a sub-sample of 33 women from these same three classes who completed the additional three-month HEAL post-literacy course, along with 5 schooled women who joined the HEAL post-literacy course only. The 65 HEAL basic course participants were tested at the end of the six-month literacy course in June 1993, and the 38 women who completed the post-literacy course were tested again at the end of the 3-month post-literacy course in Feburary 1994.

A comparison group of 50 women (Group 4) was included to provide some comparison between women who have received no education, either formal or non-formal, with women who have received some health or literacy education.. The comparison group consisted of 25 women from Makwanpur district and 25 women from Ilam district, chosen on the basis that none of the women had participated in any type of literacy program, nor were they meeting regularly with a CHV. The data set does not provide pre-test information about skill or knowledge level for any subject, so it is impossible to know what subjects' reading and writing skills or knowledge about health was before starting the educational program. The inclusion of the comparison group provides an approximate

"baseline" for generating hypotheses about the effectiveness of non-formal education approaches on women's health knowledge and literacy skill acquisition. Comparison group subjects were interviewed and tested one time only in February, 1994.

The only thing clear about group and site selection is that it was not random. Literacy class sites (Groups 2 and 3) were purportedly chosen based on the geographical, cultural, and programmatic balance needed within the larger research and evaluation study of which this data is a subset (i.e., enumerators tried to find a balance of classes that would add to the overall balance in the larger study in terms of geographical spread within Nepal--east, west, central--caste distribution, program type distribution, topographical differences--hills, mountains, Terai). Group 1 sites were chosen based on an understanding of the CHV activity level in Makwanpur district, where Group 1 sites are situated; the British health volunteer familiar with the Community Health Volunteers in that district suggested the three sites, two of which had "active" CHVs and one of which had an "inactive" CHV. While random sampling was not used to choose any of the research sites, one of the comparison group sites is in the same district--Ilam--as the women in the "literacy only" group, and the other comparison group site is in the same district--Makwanpur--as the CHV-lead subjects and the subjects who participated in the HEAL project.

Sample and Sample Size

Subjects in the three non-formal education groups were not chosen randomly; rather, they were chosen based on their participation in the health meetings, basic literacy

class or HEAL class in the site that was chosen. In other words, all women who were identified by the CHV or class facilitator as having participated in the respective non-formal education programs, including dropouts, were asked to participate in the study. In the comparison group sites, the protocol called for enumerators to make a survey of all women in the village and then to randomly choose 25 women from that survey; whether this is in fact how comparison group subjects were selected is unknown.

Table 3.1 summarizes each group, the type of non-formal education they received, and the dates of their testing/interviewing:

Table 3.1 Summary of Groups Being Studied

Groups	Number	NFE Type	Date(s) Tested
Group 1, 3 Sites	73 who attended Mothers' Group meetings	Health education only (from CHV-lead meetings)	November 1994
Group 2, 2 Sites	49 who enrolled, 38 who completed basic literacy course	Literacy education (from Production Credit for Rural Women basic literacy classes)	June 1993
Group 3, 3 Sites	80 who enrolled, 65 who completed basic course, and 33 of these who completed post-literacy course + 5 who completed post-literacy course only	Health and literacy education (from HEAL health/literacy classes)	June 1993 (first test), and February 1994 (second test)
Group 4, 2 Sites	50 subjects, (25 literacy test only, 25 literacy and health test)	Comparison group (no non-formal education exposure)	February 1994

Data Sources and Measures

The data on literacy course participants (PCRW Group 2 and HEAL Group 3) was collected as part of a larger research and evaluation project conducted by World Education from January 1993 to June 1994. All data were collected and documented by Nepali enumerators. All enumerators were Nepali-speaking, and they either spoke the local languages known by participants or they had an assistant who spoke the local language. To collect data on the dependent variables of literacy skill and health acquisition, all subjects were given a literacy test and an oral health knowledge interview[2] (see Appendix for test formats). To collect data on the individual factors related to skill and knowledge acquisition, enumerators used a form for collecting basic demographic information. To collect data about class-related factors that may influence literacy skill and health knowledge acquisition, the enumerators observed classes and/or talked with facilitators, CHVs and participants and wrote their findings up in narrative field reports. The data for answering hypotheses about the influence of community-related factors was gathered by enumerators who talked to facilitators and community leaders and recorded the information on a standard report format (see Appendix).

The following information is available in this data set:

1. **Literacy score** for each subject. This score is derived from a standard literacy test given to each subject. Literacy tests were administered to classes as a whole, supervised by the enumerator. Individual literacy tests were administered to drop-outs or those

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2 Note: All 50 women were given the health knowledge interview, but literacy test data from one of the comparison groups (25 women) is missing.

participants who were not present in the class on the day of the test, in which case the enumerator attempted to find them at their homes. Literacy scores are missing, however, for a few class participants and a few drop-outs.

The literacy test has a possible score of 120. The test was in three parts: if a subject completed one part, they were given the next part. Subjects' scores are thus comprised of all the correct answers from all of the test parts that they were able to finish. Subjects who participated in the PCRW literacy classes (Group 2) were tested at the end of their six-month literacy course. Some HEAL participants (Group 3) were tested twice: 65 women in the three classes who finished the six-month course were tested once at the end of their six-month literacy course and the 38 women who finished the additional three-month post-literacy course were tested again at the end of the post-literacy course. Group 1subjectss (CHV-lead health education) and Group 4 subjects (comparison group) were tested once in November and February, 1994, respectively; literacy test scores from one site in Group (25 subjects) are missing. The literacy test, in Nepali, is included in the Appendix.

2. **Health knowledge score** for each subject. This score is derived from a 28-question interview, given orally and individually to each subject, usually at their home. It is not known what the setting of each interview was (e.g., whether other family members, class participants or neighbors were present). Subjects who participated in the PCRW literacy classes (Group 2) were interviewed at the end of their six-month literacy course. HEAL participants (Group 3) were interviewed twice: 65 were interviewed once at the end of the six-month course and 33 of these who attended and finished the post-literacy

course were interviewed again at the end of the three-month post-literacy course. An additional five schooled subjects who joined and completed the HEAL post-literacy class (but not the basic literacy course) were interviewed once at the end of the three-month course. Group 1 and Group 4 subjects were interviewed once.

Questions on the interview include sixteen knowledge questions, five attitude questions, and seven questions about actual health practice. Knowledge questions covered the following topics: oral rehydration, immunization, family planning, smoking during pregnancy, birth spacing, AIDS, intestinal worms, dog bites, and water sanitation. The five attitude questions cover the following topics: ideal number of children, whether women should smoke during pregnancy, how many years apart births should be spaced, when one should go to the health post, and when one should go to the hospital. The seven questions about health practices cover the following topics: use of family planning, latrine use, and seeking advice in case of children's illness.

3. **Demographic data** about each subject, specifically age, marital status, ethnic group/caste, first language, number of children, distance from home to road, distance from home to health post, and ownership of radio. Demographic information was collected via oral questionnaire, conducted by the enumerator who asked either the subject or a close family member (husband, father, or mother). Subjects sometimes opted to have a close family member provide demographic information for them if they felt that they did not have more time to contribute to the study. Between the literacy test and the health knowledge interview, some subjects suggested that their workload was too heavy to allow

them to spend more time with the enumerator, and enumerators felt that family members could provide accurate information about subjects' age and marital status, etc.

4. **Class-related information** is available for each non-formal education group (but not, of course, for comparison groups). Enumerators observed classes, talking with the facilitators, CHVs or participants, and then wrote this information up in narrative form as part of the field report they completed on each site. Thus, the consistency of this information across sites is poor. Classroom information in the data set for each of the two classes in Group 2 and each of the three classes in Group 3 includes information about the drop-out rate and size of the class (number of participants at beginning of course and number who completed); the facilitator's gender and qualifications; the time and location of the class; distance to class and hours of instruction for all the participants in that class; the number of times the class was supervised; the regularity of participants' attendance; whether participants had books, notebooks and pencils; and the center "rating" (a composite of adequate lighting, books and blackboard).

For subjects in Group 1, who received health education from a CHV, there is information about the topics they say they learned about from the CHVs. The following information is available about the type of educational intervention provided by the three CHVs in Group 1: whether or not she is literate, how many years she has been serving as the CHV, approximately how many Mothers' Group meetings she has facilitated during that time, how the Mothers' Group meetings were organized, what general topics were covered in Mothers' Group meetings, and approximately how many women regularly attend the meetings.

5. **Community-related information** is available for each non-formal education site (but not for comparison group sites). Using a standard form, consisting of 14 open-ended questions, the enumerator collected and wrote down information about the community's population, economy, location, occupations, and development activities. Interviews were conducted with three "leaders" in the community (usually the Community Health Volunteer, Village Development Committee worker, or District Development Worker) and they were not taped; answers were recorded in writing directly on the questionnaire form. Therefore, the quality of the information varies according to the enumerator, depending on the care with which they filled out the questionnaire. Community-related information available includes: the number of households in the village, caste representation in the village, distance from village to essential services (road, hospital, health post), main occupations in the village, main foodstuffs in the village, and major development activities in the area in the last several years.

Data Management

The data "set" came to me in varied form. Most of the data had already been scored or coded by the enumerators in Nepal. Literacy test scores were available only as number scores on a sheet of paper, along with the subjects' code number. Demographic data were also available only as numbers. Age, number of children, distance to health post, and distance to road were coded as continuous variables, while marital status, radio ownership, caste, and first language were already coded as categorical variables. Class-related quantitative data pertinent to individual subjects (hours of instruction, distance

from home to class), where available for subjects in Groups 2 and 3, were also included as numbers in the data set for individual subjects. All of this information was re-entered into a newly-established SPPS file, subject by subject. Information about hours of instruction was used to determine participation level for subjects who participated in the literacy classes in Groups 2 and 3; subjects who completed less than 100 hours of instruction were classified as "drop-outs". Subjects who completed less than 25 hours of post-literacy instruction in the HEAL program were classified as post-literacy "drop-outs". Information about hours of instruction in the CHV-lead mothers' group meetings was not complete enough to classify subjects in those sites as drop-outs.

Health knowledge interviews were available in their original, Nepali form. With the help of a Nepali informant, I translated each health knowledge interview into English and then scored it (see Appendix for translated version of the interview). The interview included knowledge questions, attitude questions and practice questions. There were one or more questions on nine different health knowledge content areas in the interview. Each question was worth one or more points towards the total knowledge score. The content areas, along with the number of questions on that topic and the total possible knowledge points for those questions, are as follows: oral rehydration (4 questions, 6 points), immunization (4 questions, 9 points), family planning (1 question, 2 points), smoking during pregnancy (1 question, 2 points), birth spacing (1 question, 2 points), AIDS (1 question, 2 points), intestinal worms (1 question, 1 point), dog bites (1 question, 2 points), and water sanitation (2 questions, 5.points). Subjects received a knowledge score on the basis of the total number of correct answers (out of 31 possible correct answers) on the

knowledge questions. This number was then entered into the SPPS data file as their health knowledge score. For each content area, subjects also received a coding that they either demonstrated "correct knowledge" in that content area or not. For example, if a subject received 2 out of 2 possible points in the content area of family planning knowledge, she received a code of "1" in that content area, indicating that she had demonstrated correct knowledge of family planning. This was done so that, in addition to comparing health knowledge scores across groups, the percentages of correct knowledge responses on different topics could be compared across groups. Those subjects who had completed the HEAL post-literacy course had a second health knowledge interview (using the same instrument), and this second interview was translated, scored, coded and also entered into the data file.

The five health attitude questions cover the following content areas: ideal number of children (1 question), whether women should smoke during pregnancy (1 question), how many years apart births should be spaced (1 question), when one should go to the health post (1 question), and when one should go to the hospital (1 question). Attitude questions were coded according to the actual number given as an answer (e.g., number of years between births) or according to the range of different responses for each question (e.g., whether women should smoke during pregnancy was 0=no, 1=yes). The seven questions about health practices cover the following topics: use of family planning (1 question), latrine use (2 questions), and seeking advice in case of children's illness (4 questions). For practice questions, number codes were given according to the range of different answers (e.g., don't use a latrine=0, use a latrine=1 or 0=seek advice from

husband, 1=seek advice from CHV, etc.). Coded answers were then entered into the data file. Further information about the specific coding of each knowledge, attitude and practice content area will be presented in Chapter 6 with the results of the health interview.

Class-related information for Groups 1, 2 and 3 was available in narrative form, from the enumerators' field reports. The information for Group 1 (CHV/health education sites) was slightly different than the information for the literacy class sites (Groups 2 and 3), largely because of the different nature of the non-formal education programs. These field reports were translated into English. I then set up a matrix with 10 columns, one for each site in the study, and rows for the numerous class-related variables that were included in the field reports, such as facilitator gender, facilitator educational level, number of times class was supervised, etc. I then wrote the relevant class-related information for each site in the appropriate cell.

Community-related information was also placed on this matrix. Community-related information was available from the original standard forms filled out by the enumerators (see Appendix for English version of the community context form.) These field reports were given to me in Nepali for each site except the comparison group sites; forms for those sites had been misplaced or never written and could not be found. After translating them into English, I then added cells onto the matrix for community-related variables such as population, economic status of the community, availability of electricity, etc., and placed the information about each variable in each site in the appropriate cell on the matrix.

There matrix also in cluded a row for "literacy score rank" and "health knowledge score rank"; the site that received the highest mean score on the literacy test was ranked "1", the site that received the second highest mean score was ranked "2", and so forth.

Analysis

There are two main dependent variables in this data sett: literacy test score and health knowledge score. These variables were used with both quantitative independent variables and qualitative independent variables to test the hypotheses under the two main research questions of the study. The specific analyses used to test each hypothesis is presented below.

First, a profile of the sample, by group and site, is presented in order to lay the foundation for understanding differences between groups in individual, class-related and community-related factors. Using the quantitative demographic and class-related data, descriptive statistics are presented about the sample as a whole and about subsets of the sample who dropout from the basic literacy classes or who complete the post-literacy class. ANOVA was used to determine significant differences between groups. Bi-variate correlations were run to identify individual factors associated with dropping out. The qualitative data on class-related and community-related factors (from the matrix) was used to produce a descriptive profile of each group and site.

Next, the primary research questions are addressed. The first of the primary research questions in the study was: "To what extent is there a difference in literacy skills and health knowledge acquired between a group of women who received literacy

instruction, a group of women who received literacy instruction with a health focus, a group of women who received health instruction, and a group of women who received no non-formal instruction at all?" Three hypotheses were tested in order to answer this question.

To test the hypothesis that women who participate in some type of non-formal education will acquire more literacy skills and health knowledge than women who have not participated in non-formal education, means testing was used to determine whether significant differences existed between the four groups.

The same means testing was also used to test the hypothesis that women who participate in an integrated literacy/health program will acquire more literacy skills than women who participate in a "literacy only" program and more health knowledge than women who participate in a "health only" program. After the multiple regression was run to determine which individual variables might predict literacy skill or health knowledge acquisition, ANOVA tests were run, comparing the literacy means and health knowledge for each group but controlling for strong predictor variables, to see if differences between groups were still significant. In order to determine if health knowledge, attitudes and practices are different based on non-formal education approach, chi square tests were used to compare the percentages of correct knowledge in the specific content areas across groups. Similarly, chi-square was also used to compare attitudes and practices across groups. Log-linear analysis was used to determine the relationship between knowledge and practice in the area of family planning and whether this relationship is also associated with non-formal education participation and approach.

To test the hypothesis that women who participate in a post-literacy/health program will acquire more literacy skills and health knowledge than women who participate only in a basic-level non-formal education program, the scores of women who completed the post-literacy course were also included in the means testing. Paired sample t-tests were also used to determine the increase in literacy skills and health knowledge among subjects who completed both the HEAL basic and the HEAL post-literacy course.

The second of the primary research questions asked "What are some of the factors or "influences" that might explain possible differences between groups?" Four specific hypotheses were tested in order to address this question.

To test the hypothesis that individual factors (such as age, marital status, previous educational experience, hours of instruction, etc.) may influence literacy skill and/or health knowledge acquisition, multiple regression was used. One multiple regression analysis was run with basic literacy test score as a dependent variable, and one was run using basic health knowledge score as a variable. Two more multiple regression analyses were run only with subjects who completed the HEAL post-literacy course, in order to determine whether individual variables also affected skill and knowledge acquisition at the post-literacy level.

To test the hypothesis that literacy skill and health knowledge acquisition are interrelated, a multivariate analysis was run (using both basic literacy score and health knowledge score as dependent variables).

To test the hypotheses that class-related factors and community-related factors may influence literacy skill and health knowledge acquisition, all of the classroom and

community context information for each site were analyzed through the development of a checklist matrix (Miles and Huberman, 1994), which was used to identify the supporting and/or hindering conditions in each class and community, such as class venue, presence of electricity in the village, or recent development activity. Pattern matching (Yin, 1994) was used to develop hypotheses of supporting and hindering factors that might explain differences in literacy skills and health knowledge acquisition between groups and sites.

Limitations

The data for this exploratory study is taken from an existing data set developed through a larger research and evaluation study conducted by World Education from 1993-1994 in Nepal. Thus, the quality of the information available for this dissertation study is limited by the quality of the data in the larger data set. The protocols for collecting data were intended to be the following: literacy tests were given in a group (class by class), but interviews to ascertain health knowledge were conducted individually with each participant; demographc data collection was done through an interview conducted either with the subject or with a close member of the subject's family. Class-related and community-related information was supposed to be collected through observation and through talking with facilitators, CHVs, local leaders and participants.

General Design Limitations

Perhaps the biggest design problem is that there is a fundamental difference between the comparison group and the non-formal education groups. That differences

stems from the fact that participants in non-formal education programs volunteer to take part in the meetings or the classes, whereas comparison group subjects were selected to be in the study but either have never had the chance or the inclination to join a non-formal education program. Thus, there may exist fundamental motivational differences between subjects in the comparison group and the other subjects, which reduces the validity of using Group 4 for comparison of literacy skills and health knowledge.

Another general design problem is that a proportion of the subjects in the supposedly "health only" group actually had acquired literacy skills through either schooling or a previous literacy class. Thus, they did not really represent a group of women who had received only health education through CHV-lead activities. This turned out to be advantageous, in that it helped to answer one of the hypotheses in question: whether previous education was an important factor in literacy skill and health knowledge acquisition.

The fact that some women in Group 1 had attended a previous literacy class also helped to overcome another design flaw; namely, that it is not wise to make a judgment about whether women who participate in an integrated health/literacy program acquired more literacy skills and health knowledge than women who participated in non-integrated programs based solely on comparing the HEAL program with one other basic literacy program. Program implementation plays a role in any given non-formal education program, and since it appears that the PCRW basic literacy classes may have been poorly run, that might account for lower literacy skills and health knowledge scores. This might have lead to a conclusion that an integrated program is a better non-formal education

design compared to "literacy only", rather than that the HEAL program was just better implemented than the PCRW program. However, the subset of women in Group 1 who had attended a previous literacy class provided another example of "literacy only" that gave another form of comparison with which the test the hypothesis about the benefits of integrated design.

Finally, the design suffered from too little ethnographic data collection, resulting in information about the individual sites that was much too "thin" to really test hypotheses about the influence of class-related and community-related factors that may influence literacy skills and health knowledge acquisition, over and above the effects of non-formal education program design. More in-depth information about the specific classes and communities in the study would have provided a richer profile of each site and a better foundation from which to draw conclusions about the reasons for differences between groups.

Reliability Issues

There are multiple sources of evidence, but it is unclear just how these multiple sources of evidence were combined and coded to produce the data presented in the data set, and the original questionnaire answer forms are only available for a few of the sites, so double-checking is impossible. For example, all of the health knowledge interviews were available for each subject, but literacy test papers were not available for any subjects. Most, but not all, of the community context questionnaire forms are available for the sites, but the interviews with facilitators, supervisors and class participants in each site are

represented in field reports that are inconsistent across the sites. Thus, the study is limited by the fact that I cannot access the original sources of evidence from questionnaires, translate them and determine whether the data presented by number in the data set is accurate for all variables.

In some cases, there is missing data (e.g., missing literacy scores for 25 of the comparison group members) or the quantity of the information provided in the enumerator's field reports varies by enumerator, thus affecting the quantity of information about particular sites. In other cases, it is unclear whether the same protocols for interviewing subjects were followed by each enumerator. Whether each subject was indeed alone during the interview is unknown and, to some extent, unlikely, given the nature of village life in Nepal, where people gather round an outsider, and it is unclear whether this affected the type of answer a subject gave. Some interviews were supervised by research field coordinators, which seemingly did not ensure accuracy; one comment from an enumerator indicates the possibility of contamination by researchers during some of the interviews: "Field coordinator should not express his views on the participants' answers...he should not be correcting the wrong answers from the participants. In such a case, the participants tend to answer according to the coordinator's expectation." The extent to which this actually happened and whether participants' answers do or do not reflect their actual knowledge is impossible to know, since it is not known how many or which interviews were supervised by field coordinators.

Validity Issues

Since it seems clear that the instruments were never well pre-tested, the study is limited by the design of some of the questionnaires and data collection protocols. One of the questions on the health knowledge interview, for example, was worded unclearly, thus making the answers unusable, and another question was so general that every subject gave the same answer. These questions were not included in the coding or analysis. Some demographic information on important variables is missing because of the phrasing of the question. For example, subjects were asked how many years of school they had completed rather than whether they had attended school for any time. Thus, since many children in Nepal start first grade but never complete it, we do not have accurate information about their previous educational exposure, since only those who had completed a full year or more are given a number code; the rest are given a "0", making it impossible to distinguish between those who never attended and those who attended part of the first grade and then dropped out.

Another example of the quality of demographic information being affected by question type is related to mother tongue: subjects were asked what their first language was, rather than what language they speak every day and whether they had any Nepali oral language skills before entering the class. Thus, if they speak a first language other than Nepali, it is impossible to know their true exposure to Nepali, making it difficult to draw definitive conclusions about how difficult learning to read in Nepali was for subjects who were not native Nepali speakers.

There is incomplete information about the gender of the enumerators in each site, but it is clear that some were men and that this may possibly have affected answers in topic areas such as family planning; comments by some of the male enumerators indicate that they believe they were not getting full answers from some of the subjects about family planning or birth spacing.

Finally, it is unclear to what extent the instruments accurately provide information about literacy skills and health knowledge. Since testing is foreign to adults who have only recently learned to read and write, the literacy test scores may actually, in some part, reflect the subject's ability to take a test. How and how well each enumerator supervised and provided instructions about taking the test is unknown, but the administration of the test may certainly have affected scores in some cases. Similarly, anecdotal reports from other sources (Smith, 1994) indicate that one of the self-reported outcomes of the literacy class is sometimes that women feel more comfortable speaking with strangers. Therefore, the oral health knowledge interview may serve, in part, as an indicator of how confident subjects felt talking with enumerators (who are outsiders to the village) rather than as an indicator of true health knowledge and attitudes. There is also the possibility that some of the subjects provided information about their health practices based on what they thought the enumerator wanted to hear rather than on their actual behavior. The extent to which all of these factors affects the validity of the data is unknown and cannot be cross-validated from the qualitative data that exists.

Generalizability

There are also limitations to the generalizability of the conclusions because of the small sample size in some of the groups. For example, there were 27 dropouts from the literacy classes, so it is impossible to determine which factors may predict dropouts, since this number is too small to run a generalizable multiple regression test. Similarly, only 38 women completed the post-literacy course, and some of these have missing test scores for either literacy or health. This is also a small group from which to draw strong conclusions related to the main questions and specific hypotheses. In addition, the groups (health only, literacy only, HEAL, and comparison) differed from each other significantly on variables such as caste and language. These types of limitations will be discussed in the dissertation as they relate to the analysis and conclusions.

Bias

Finally, the study is potentially affected by my past and current involvement with the HEAL program and with World Education, the sponsor of the program. Since 1992, I served as the World Education consultant to the HEAL program, assisting the World Education/Nepal staff who developed and conducted the pilot program. I also wrote the summative evaluation of the project. While this involvement may make me biased toward the program, my familiarity with it also makes me more aware of its flaws, particularly in relation to its implementation. I know firsthand that, like other literacy programs, the HEAL program had its fair share of teachers that moved away, or supervisors that didn't come to class, lanterns that went missing, facilitators that taught by rote, and classes that

were disrupted by political infighting. Although I do truly want to know whether there is any benefit to integrating health and literacy programs in Nepal, my biases, combined with the exploratory nature of the study, compel me to carefully consider all factors that may affect the results of the comparison of these non-formal education programs and to conscientiously propose all realistic hypotheses that explain any differences between them.

CHAPTER 4

PROFILE OF SAMPLE

From the data set, the makeup of the sample as a whole can be determined. In this section, a profile of the sample is given, according to individual, class-related and community-related factors, along with descriptive statistics of those subjects who completed one of the three basic non-formal education programs, subjects who dropped out of the literacy classes, and subjects who completed the HEAL post-literacy course. The conclusions of the study need to be based on the concept that the groups are not too dissimilar in makeup for comparison, or, if they are dissimilar, that an understanding of their dissimilarity informs the analysis, hypotheses and recommendations generated in the study. If those who drop out or, conversely, those who persist through to the end of post-literacy classes look different from the basic participants and the comparison group, then this provides a foundation for understanding the differences in skill and knowledge acquisition that appear between groups.

Methods

ANOVA and descriptive statistics are used with the quantitative data to compare subjects within these subsets of the sample, in order to see significant differences between subjects demographically and based on level and type of participation.

The decision was made to classify and remove from final analysis the women who were drop-outs from literacy classes so that the scores of those women who didn't

complete the literacy course, either basic or post-literacy, would not lower the means for the group as a whole.[1] A participant was classified as a drop-out if she attended less than 100 hours of instruction in the six-month basic course (out of a standard 288-300 hours for the six-month course), and as a post-literacy course drop-out if she completed less than 40 out of 75 hours of post-literacy instruction.

The final section in this chapter presents a descriptive profile of each group, and of the non-formal education context of each site, using information from the matrix created of class-related and community-related factors.

Findings

Profile of Whole Sample

The number of subjects tested and interviewed totaled 252. Among the whole sample, participation in the various non-formal education programs was as follows: 27 women dropped out of the literacy classes in Groups 2 and 3, while 97 women completed the six-month basic literacy course. The drop-out rate is higher in Group 2 (PCRW/literacy only classes) at 29% of enrollees than in Group 3 (HEAL) at 16% of enrollees. In the HEAL sites, 48 women joined the post-literacy class: 10 of those who completed the basic course started then dropped out of the HEAL post-literacy course. Of these 38 completers, 33 completed both the basic and HEAL post-literacy course, and 5 joined the HEAL post-literacy class only (having acquired basic literacy skills in school)

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1 Attending a post-literacy class was only an option for subjects in the HEAL sites (as the Production Credit for Rural Women program in Group 2 did not offer a post-literacy course).

and finished it. The sample is rounded out by 73 women who received instruction from a CHV, and the 50 women who were members of the comparison group.

For the whole sample, including dropouts, the mean age was 27.9, with a minimum age of 13 and a maximum of 65. 195 (77.3%) of the subjects were married. Mean number of children among married subjects was 2.7. Twelve different castes or ethnic groups are represented in the sample, with the largest percentage being Tamang (n=103, 40.9%), followed by Brahmin (n=58, 23%), Magar (n=30, 11.9%), Chhetri (n=19, 7.5%), and small numbers of Newar (n=6), Pariyar (n=4), Lapcha (n=9), and Helmu (n=4). Nepali is the most frequently represented language, with 115 (45.6%) of the subjects identifying it as their first language. 37.7% of subjects speak Tamang, 9.1% speak Magar, and the remaining 7.6% identified their ethnic language as their first language. (However, we have no information about how many participants speak both Nepali and another language, either before or after attending the literacy class.) In this sample, 27 women (10.7%) had some schooling as previous education, 22 (8.7%) has attended another literacy class previously, and 203 (80.6%) either had never had any previous education or there is no information about their previous education. Radios were owned by almost exactly half of the households in the study: 124 (49.2%) owned a radio and 128 (50.8%) did not.

Table 4.1 compares the marital status, number of children, and ethnic group composition of the study sample with the composition of the total female Nepali population as a whole, from the 1991 census, as cited in Acharya (1994):

Table 4.1 Comparison of Study Sample to General Population

Characteristic	1991 Nepal Census:	Study Sample (n=252):		
		%	n	Range
First language				
Nepali	50.3%	45.6%	115	--
Tamang	4.9%	37.7%	95	--
Magar	2.3%	9.1%	23	--
Number of children	2.9	2.7	195	0-8
Marital Status				
% aged 10-19 married	46%	5%	13	--
% aged 10-24 married	86%	21%	54	--

With regards to previous education, the 1991 census states that 33.6% of girls aged 6-15 have ever enrolled in school, although this number is doubtless much less in rural areas, which is high compared to the 10.7% of women in the study sample who had ever attended school.

Demographics of Groups, by Participation Level

Age

Mean age ranges from a low of 22 in PCRW/Site 5 to a high of 32 in CHV/Site 1. Subjects in the CHV/health-only group were older than in the other groups. On the whole, the 38 women who completed the post-literacy course are slightly younger than the sample as a whole and than those who completed the HEAL basic course. In the literacy class groups, dropouts are older (mean age 31) than those who complete either the basic

course (mean age 25) or the post-literacy course (mean age 25). Table 4.2 provides age means for subjects by group and participation level:

Table 4.2 Mean Age, by Group and Participation Level

Group	Basic Course/Health Ed Completers		Dropouts		Post-literacy Course Completers	
	N	Mean	N	Mean	N	Mean
1: CHV only	73	31.22	--	--	--	--
2: Literacy only	35	25.17	14	35.21	--	--
3: HEAL	67	25.75	13	25.77	38	24.66
4: Comparison	50	26.36	--	--	--	--

Significant differences in age exist between Group 1 and Group 2, and between Group 1 and Group 3. The comparison group is not significantly different from the other groups in age.

Marital Status

More subjects in the CHV/health-only group and in the comparison group were married than were subjects in the literacy groups. Percentage of married women ranged from 100% in Site 2 of the CHV/health-only group to only 52% married in Site 5 of the PCRW literacy-only group. The percent married and mean number of children corresponds to age, with PCRW/Site 5 having only 52% married and 1.64 children while CHV/Site 1 has 96% married and an average 3.19 children. The percentage of married subjects among dropouts is higher than among completers, while the percentage of

married women completing the post-literacy course is lower. Table 4.3 presents the percent of married subjects in each group by participation level:

Table 4.3 Percentage of Married Subjects, by Group and Participation Level

Group	Basic Course/Health Ed Completers		Dropouts		Post-literacy Course Completers	
	N	% Married	N	% Married	N	% Married
1: CHV only	73	97	--	--	--	--
2: Literacy only	35	60	14	86	--	--
3: HEAL	67	63	13	77	38	55
4: Comparison	50	78	--	--	--	--

Significant differences between groups in percentage of married subjects are between Group 1 and every other group. No significant differences exist between any of the other groups (comparison, HEAL and literacy-only).

Number of Children

Mean number of children ranged from a high of 3.2 in PCRW/Site 4 to a low of 1.64 in PCRW/Site 5. While the number of children was roughly the same for each of the four groups, CHV/health-only and comparison group subjects had a slightly higher mean number of children. Interestingly, in the HEAL group, even though the age of post-literacy completers is lower and the percentage of married women is less, the mean

number of children is higher for post-literacy course completers than for basic course completers. Table 4.4 presents mean number of children by group:

Table 4.4 Mean Number of Children, by Group and Participation Level (Married Subjects Only)

Group	Basic Course /Health Ed Completers		Dropouts		Post-literacy Course Completers	
	N	Mean	N	Mean	N	Mean
1: CHV only	71	2.84	--	--	--	--
2: Literacy only	21	2.38	12	3.00	--	--
3: HEAL	42	2.59	10	2.20	21	2.67
4: Comparison	39	2.82	--	--	--	--

There are no significant differences in number of children between any of the groups.

Caste/Ethnic Group

The representation of caste was not equal in each group. Most of the Brahmins were in Group 1. All of the Magars were in Group 3, all Rai in Group 2, all Lapcha in Group 2. Chhetris, Newars and Tamangs appear in each of the four groups. In some sites, there is a predominance of only one caste, rather than a mix: Site 7 has 88% Magar while Site 8 has 96% Tamang. Drop-outs are more likely to be Rai, Chhetri or Tamang than to be Brahmin, Lapcha or Magar. In the HEAL group, the representation of ethnic groups was roughly the same for those completing the post-literacy course as those

completing the basic course. Table 4.5 presents the representation of caste/ethnic group among subjects in the sample:

Table 4.5 Caste/Ethnic Group, By Group and Participation Level

Group	Basic Course/Health Ed Completers		Dropouts		Post-literacy Course Completers	
	N	%	N	%	N	%
1: CHV only	73	74% Brahmin* 11% Tamang	--	--	--	--
2: Literacy only	35	31% Tamang 20% Lapcha 20% Brahmin*	14	36% Tamang 21% Rai 21% Chhetri	--	--
3: HEAL	67	48% Tamang 43% Magar	13	77% Tamang	38	50% Tamang 42% Magar
4: Comparison	50	74% Tamang 18% Brahmin*	--	--	--	--

*Includes Brahmins and Chhetris, castes that are closely related. Helmu/Rai castes are combined.

Significant differences in caste composition exist between all of the four groups. There is no clear explanation for why Chetris (who are very similar in socio-economic standing and cultural traditions to Brahmins) would drop out more than other groups; one explanation is that Chetris are less traditionally identified as the "educated" caste (since they historically held the occupation of "warriors" or soldiers), and thus may not place as much of a premium on education. However, that would not explain why other castes and ethnic groups (who also have not not historically identified "education" as an occupation) do not dropout at the same rate as Chetris. Further research should include an

ethnographic component that might uncover differences between castes in attitudes towards education .

Language

Group 1, with the highest percentage of Brahmins, is also the group with the most first-language Nepali speakers. The percentage of Nepali speakers ranges from a low of 5% in HEAL Site 8 to a high of 96% in CHV/health-only Site 1, with the HEAL group having the lowest overall percentage (22%) of Nepali-as-a-first language speakers. Table 4.6 presents an overview of Nepali first-language speakers, by group and participation level:

Table 4.6 Percentage of Nepali Speakers, by Group and Participation Level

Group	Basic Course/ Health Ed Completers		Dropouts		Post-literacy Course Completers	
	N	% Nepali	N	%Nepali	N	% Nepali
1: CHV only	73	86%	--	--	--	--
2: Literacy only	35	46%	14	36%	--	--
3: HEAL	67	22%	13	23%	38	18%
4: Comparison	50	26%	--	--	--	--

Like caste composition, significant differences in first language exist between all the groups.

Previous Schooling

The percentage of women with previous schooling ranges from a high of 24% in CHV/Site 3 to no women at all with previous schooling in HEAL/Site 6 and Comparison Group/Site 10. Since 5 women joined the post-literacy class after having completed some schooling (rather than the basic literacy course), the percentage of post-literacy completers with previous schooling rises from 7.5% to 13%. Completers are no more likely than dropouts to have been schooled. Table 4.7 presents the percentage of schooled subjects in each group, by participation level:

Table 4.7 Percentage of Schooled Subjects, by Group and Participation Level

Group	Basic Course/ Health Ed Completers		Dropouts		Post-literacy Course Completers	
	N	%Schooled	N	%Schooled	N	%Schooled
1: CHV only	73	19%*	--	--	--	--
2: Literacy only	35	9%	14	7%	--	--
3: HEAL	67	8%	13	8%	38	13%
4: Comparison	50	6%	--	--	--	--

*Another 30% of Group 1 subjects had also attended a previous literacy class.

Significant differences in previous education exist between Group 1 and every other group, but there are no significant differences in level of previous education between literacy only, HEAL and comparison groups.

Radio Ownership

A total of 52% of all subjects have a radio in their households. The percentage of women who have a radio varied from only 21% in PCRW/Site 4 to 80% in HEAL/Site 7. Radio ownership is not necessarily connected to the availability of electricity: radio ownership in CHV/Site 1 (where electricity is readily available) and in HEAL/Site 8 (where no electricity is available) was 59% in both sites. More post-literacy completers own radios (71%) than do HEAL basic completers (66%). Dropouts among HEAL participants are less likely than completers to own a radio, while radio ownership among PCRW/literacy-only subjects was roughly the same for both dropouts and completers. Table 4.8 presents the percentage of subjects with radios in their households:

Table 4.8 Radio Ownership, by Group and Participation Level

Group	Basic Course/ Health Ed Completers		Dropouts		Post-literacy Course Completers	
	N	%w/ radio	N	%w/ radio	N	%w/ radio
1: CHV only	73	62%	--	--	--	--
2: Literacy only	35	31%	14	36%	--	--
3: HEAL	67	66%	13	8%	38	71%
4: Comparison	50	36%	--	--	--	--

Group 1 and Group 3 are not significantly different in radio ownership, and Group 2 and Group 4 are not significantly different. Otherwise, significant differences exist between the other groups in percentage of subjects owning radios.

Distance to Health Post and Road

In general, roads are closer to the villages in which subjects lived than are health posts, with an overall mean distance to health post of 1½ hours walk compared to a mean of just under an hour's walk to the road. However, the range was extreme, with one site (CHV/Site 3) being only two minutes walk to the road, while the road in another site (HEAL/Site 8) was almost 260 minutes (4 1/3 hours) walk away. The most isolated site from health services is CHV/Site 8, which is situated 3 1/3 hours walk away from the nearest health post. Dropouts live farther from the road and the health post than do counterparts in their respective groups who completed the basic literacy course or the post-literacy course. Tables 4.9 and 4.10 present mean distances to health post and to the road:

Table 4.9 Distance to Health Post, by Group and Participation Level

Group	Basic Course/ Health Ed Completers		Dropouts		Post-literacy Course Completers	
	N	Mean	N	Mean	N	Mean
1: CHV only	73	90.44	--	--	--	--
2: Literacy only	35	117.43	14	129.29	--	--
3: HEAL	67	106.86	13	114.62	38	101.05
4: Comparison	50	77.00	--	--	--	--

Significant differences in distance to health post exist only between the comparison group and Groups 2 and 3.

Table 4.10 Distance to Road, by Group and Participation Level

Group	Basic Course/ Health Ed Completers		Dropouts		Post-literacy Course Completers	
	N	Mean	N	Mean	N	Mean
1: CHV only	73	15.23	--	--	--	--
2: Literacy only	35	61.20	14	103.21	--	--
3: HEAL	67	98.86	13	125.15	38	90.81
4: Comparison	50	48.70	--	--	--	--

Significant differences between groups in distance to the road are between Group 1 and Group 2, and between Group 1 and Group 3; CHV/health-only subjects live much closer to the road. The comparison group is only significantly different from the HEAL group.

Distance to Class[2]

Literacy course participants lived an average of 15 minutes walk from the class, ranging from as close as 10 minutes walk for participants in PCRW/Site 4 to as far as 20 minutes walk for participants in HEAL/Site 6. The mean distance to class for dropouts (19 minutes walk) was longer than for basic course completers (15 minutes walk) or for post-literacy course completers (14 minutes walk). The shorter mean distance to class for post-literacy course completers is largely due to Site 8, where post-literacy course completers walked an average of only 5 minutes to class; the other two sites in this Group

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2 Information about distance to class is not available for Group 1 (CHV-lead health only) subjects and is not applicable to Group 4 (comparison group) subjects.

did not see a similar drop in mean distance to class among post-literacy class completers. Table 4.11 presents information about the distance to class among the literacy class participants in Groups 2 and 3:

Table 4.11 Distance to Class, by Group and Participation Level

Group	Basic Course/ Health Ed Completers		Dropouts		Post-literacy Course Completers	
	N	Mean	N	Mean	N	Mean
2: Literacy only	35	15.49	14	20.86	--	--
3: HEAL	67	15.85	13	17.77	38	13.87

There is no significant difference between groups in distance to class. Unfortunately, there is no information about how far away from each other the students in the sites lived, but future research should endeavor to collect information about the isolation of individual participants' houses, as a possible factor in dropout and completion rates, since women living farther from classes may accompany each other to class each day.

Hours of Instruction

Overall, the mean hours of instruction at 189 is considerably lower than the 288 hours of instruction for which the six-month basic literacy course is designed. 189 hours (at six days a week, two hours a day) equals just under four months of literacy class meetings. The mean hours of instruction by site ranged from a low of 164 for HEAL/Site 8 (about 3 ½ months of class) to a high of 208 for HEAL/Site 7 (about 4 1/3 months

instruction). This is an indication that, on average, participants did not attend classes for the recommended hours of instruction intended in the course design. Table 4.12 presents information about mean hours of instruction among literacy class participants in Groups 2 and 3:

Table 4.12 Hours of Instruction, by Group and Participation Level

Group	Basic Course/ Health Ed Completers*		Dropouts**		Post-literacy Course Completers***	
	N	Mean	N	Mean	N	Mean
2: Literacy only	35	182.63	14	57.86	--	--
3: HEAL	67	193.15	13	64.67	38	62.06

*Basic course should run 288 hours.
**Dropouts were those subjects who attended less than 100 hours.
***Post-literacy course should run 75 hours.

Hours of instruction between groups is not significant (p=.33). Differences between sites in hours of instruction is significant overall (p=.02), but a Scheffe test indicates no significant differences between any two sites at the .05 level in mean hours of instruction.

Profile of Groups and Sites

The following profiles provide a basic description of each of the groups, as well as a description of the non-formal education context in each site within the groups.

Profile of Group One: CHV-lead health education only

This group includes women who attended monthly Mothers' Group meetings and received non-formal health education from female Community Health Volunteers. The three sites in this group are all in Makwanpur district, located approximately 50 kilometers southwest of Kathmandu. The district covers land partly in the hill region and partly in the Terai region, the flat band of land in the south of Nepal. The 73 women in these three sites are older than in the other groups, with more children. Three quarters are Brahmin or Chhetri (the highest castes of Nepal); most speak Nepali, and almost 1/5 attended school for between 3 and 8 years. Since the women in this group are, by definition, members of Mothers' Groups, almost all are married. Overall, the sites are not too remote, ranging from 2 minutes to 30 minutes walk to the road. All sites are larger villages of approximately 900-2700 people each. Educational status in two out of the three sites is high, with 70-80% literacy. All three sites have some electricity, and almost 2/3 of the subjects own radios. Water is available either through well or tap, all a result of local development efforts. The main crop in each site is rice, unlike the sites in the other groups where maize or millet is the main crop, and the economic status of all three Group One sites is fair or good, according to the enumerators. Health care is generally not too remote: health posts are situated from 45 minutes to 2 hours walk, hospitals from 1-3 hours walk. Schools are close in two of the sites; in the other site, the primary school is a 30-minute walk away.

Site One non-formal education context. The CHV in this site, a village named Hatiya, is 48 years old, and she was identified as an "active" CHV by the British volunteer

informant. The CHV claims she can read and write, having participated in an adult literacy class held in the village several years back. At the time of the interview and testing, she had been a volunteer for five years, since the start of the female Community Health Volunteer program in 1989. She claims she has organized monthly meetings during the whole five years, for a total of approximately 60 meetings. When asked how she organizes the meetings, she says that she invites mothers and married women from the village; the meetings are also sometimes attended by a teacher from the local school and the Village Health Worker (a man). The meetings are held regularly on the third day of the month, when the immunization clinic is held (the "clinic" is a scheduled time when the Village Health Worker arrives at the village and immunizes any children who are brought to him). In the meetings, the CHV reviews the discussion from the last meeting and informs the group of the discussion topic for the current meeting. She regularly covers topics such as immunization, diarrhea, family planning, nutritious food, hygiene and sanitation. The Village Health Worker helps her in reading and writing and encourages the women to participate regularly in the Mothers' Group meetings, although what form this "encouragement" takes is unclear. The CHV claims that 15-25 women attend regularly. This site ranked eighth out of 10 on the health knowledge score (performing only above the comparison groups), and fifth out of 9 on the literacy scores.

Site Two non-formal education context. The CHV in this site, a village named Churiamay, was identified as fairly inactive by the British volunteer. The CHV is 30 years old and had also been working as the CHV for five years. She claims she can read and write a little bit, but it is not known whether that is a result of schooling or a previous

literacy class. She, too, says she has organized monthly meetings since the beginning, by inviting mothers or married women. At each meeting, a "chairperson" is selected from the members, and the group selects the topics for discussion depending on the season; again, it is unclear what the chairperson does or how exactly the topics are selected. The CHV uses illustrations and pictures (probably from the CHV training manual) to generate discussion. Topics for discussion have included diarrhea, family planning, pregnancy, immunization, nutrition, hygiene and sanitation. The Village Health Worker helps the CHV by sometimes attending the meetings, "teaching about the discussion method" and encouraging women to attend the meetings regularly. The CHV claims that a group of 35 women meet regularly every month, but this is unlikely since the British volunteer clearly identified this CHV as inactive, and only 21 women could be found for testing who said that they had attended any meetings. This site ranked fifth out of 10 on the health knowledge score, and nine out of 9 (the comparison group site was higher) on the literacy scores.

Site Three non-formal education context. The CHV in this site, a village named Basamadi, is 50 years old and has served as a CHV in this village for five years. The British volunteer identified her as an "active" CHV. She claims to be able to read "big print" but can write only her name. She claims to have organized approximately 60 monthly meetings; the meeting used to be held each month on the day of the immunization clinic, but recently the Village Health Worker only holds the immunization clinic every other month, so the Mothers' Group meeting also meets every other month. She informs the women beforehand about the meeting and selects the subjects herself based on the

season (e.g., diarrhea is often worse during the rainy season). If she talks about family planning one month, the next month she talks about immunization or treatment of diarrhea. She facilitates discussions about the topic, then asks one woman to stand up and talk about what she understood about the topic. She covers nutrition, family planning, pregnancy, hygiene and sanitation, immunization and diarrhea. The VHW assists the CHV by keeping attendance and by encouraging women to go to the meetings. The CHV claims that anywhere from 16-30 women attend regularly. This site ranked fourth out of 10 on the health knowledge scores (behind the three HEAL sites), and sixth out of 9 on the literacy scores.

Profile of Group Two: Literacy only

This group includes those women who attended a six-month basic literacy course sponsored by the Production Credit for Rural Women (PCRW) project, a quasi-governmental program designed to provide small loans or grants plus training to women farmers. The two sites in this group are both in Ilam district, in the far east section of Nepal, approximately 250 kilometers from Kathmandu. Among the 35 women in these two sites, the average age is 25, with only 60% married. Ethnic groups are Tamang, Lapcha and Brahmin, with less than half of the women speaking Nepali. Less than 10% had any previous schooling, and less than 1/3 own radios. The two sites are somewhat remote, one 30 minutes and the other almost two hours from the nearest fair weather road. One of the villages is small (only 420 people), the other medium-sized with 1,000 people. The educational status of both communities is very low, from 68-86% illiterate.

Maize and millet are the main crops, and the economic situation is rated poor to very poor by the enumerators. Neither site has electricity. Not much information is available about recent development activities in the sites, except that both have formed non-formal education committees, whose role it is to support the literacy classes, and in one site the women's development committee has promoted the building of latrines. Most houses in both sites have latrines. Health care is remote in one of the sites (over 2 hours walk to the nearest health post), whereas the other site is located only 30 minutes walk from a hospital.

Site Four non-formal education context. The basic literacy class in site four was held in the local school in the morning, probably from 7-9 a.m. The class received an "OK" rating, as the light was good, there was a blackboard, and there were benches on which to sit, although the school was noted to be in poor condition. The class started with 35 women and 11 dropped out before 100 hours of instruction, a high drop-out rate of 31%, although a class of 35 is generally considered large to begin with. The average walking distance to the class from participants' homes was 9 minutes, which made the class relatively convenient to most women. The class met for at least 246 hours (out of the 288 hours the class should meet in a regular six month course), or about 5 months of class; however, the median hours of instruction was only 188, or about 3.9 months, an indication that half of the class dropped out before the end of four months. However, the enumerator noted that the participation of the women in the class was "regular". The facilitator was female, with an education level less than an School Leaving Certificate pass (the Nepali equivalent of a high-school diploma). The activity level of the facilitator is not

known, nor is information available about whether there is a CHV at this site. The class was purportedly supervised 8 times (supervisors should visit each class twice a month for a total of 12 visits over the six-month course). There is a non-formal education commitee formed in this site but whether or how it supported the literacy class is also unknown. This site ranked seventh out of 10 on the health knowledge scores, and seventh out of 9 on the literacy scores.

Site Five non-formal education context. The basic literacy class in this site was held from 5-7 p.m. in the local Village Development Committee headquarters. The class location was rated as "OK"; even though there was no electricity, the class was held early enough in the evening so the light available for studying was adequate. There was a blackboard. The class started with 24 women and only three dropped out, a relatively low drop-out rate of 12%. The average walking distance from home to class was 19.3 minutes. The class met for a total of 288 hours (as represented by the maximum hours of instruction), the requisite number of hours, with a median of 194 hours and a mean of 190.38, or four months of instruction, equaling 66% of the normal course time. The facilitator was a female; in fact, she was the Community Health Volunteer for this village, and she had attended school although she had not completed her SLC. There is no information about her activity level. The class was supervised 9 times. There was a non-formal education committee, although its activities are unknown, and a women's development committee promoting the building and use of latrines. This site ranked sixth out of 10 on the health knowledge scores, and fourth out of 9 on the literacy scores.

Profile of Group Three: Integrated Health Education and Adult Literacy

The women in this group all participated in a six-month integrated health/literacy course (where twelve 45-minute health lessons were added to the basic course that used the same book, Naya Goreto, as was used in Group 2 literacy only classes), run by World Education as a pilot program; some of the participants who finished the course went on to complete a three-month post-literacy course specifically focused on health. All three sites in this group were located in Makwanpur district, the same district in which Group 1 CHV/health only sites were located. The mean age in this group is 25, and about 2/3 of the women are married. About half are Tamang and half are Magar, and only 22% speak Nepali as their first language, but the enumerator notes that many subjects spoke Nepali as well. Only 7% of the women had ever attended school, varying by site: none of the women in site 6 had gone to school whereas almost 14% of those in site 8 (the most remote site) had attended school for some unspecified time. Over 2/3 own radios. The three sites are situated in very different locations vis-a-vis the road and services: one site is not too remote (15 minutes from the road, 1 hr to the health post, 2 hours to the hospital) and another site is the most remote in the study (3 ½ hrs walk to the road, 3-4 hours to the health post, 5 hours to the hospital). The other site is in between but not too remote (30 minutes to road, 1 hour to the health post, 2 hours to the hospital). Distance to the nearest city ranges from 2 hours to over 5 hours walk. In all cases, it is quicker to get to the health post than the hospital. The villages are small to medium-sized, 480-800 people. The educational status ranges from medium to very low: only 33% illiteracy in one village to 80% illiteracy in the more remote village. The main crops are maize and millet, without

much variety in what is grown. Only one of the sites has electricity, and none of the sites has a water tap. Two of the sites have plastic pipes running water from a stream, and in the most remote site, women have to walk up to an hour to get water. In two of the sites it is unknown whether there are latrines, but it is noted that in Site 7 there are very few latrines at all. Only Site 8 has an NFE committee. Site 6 has a forestry use committee (established as a result of the decimation of the forest), and Site 8 has a milk board collection center, but otherwise no development-related activities are noted. The economic status of these villages is rated "poor" to "OK" by the enumerators. The status of the local school is unknown in one site; in Site 7 most kids go to school, but in Site 8 (the most remote site) there is a relatively new 4-year old primary school but it only runs classes for first through third grade; there is no high school. All three sites in Group 3 were ranked top three in both literacy and health knowledge acquisition (according to the mean scores for each site), compared to the other sites.

Site Six non-formal education context. The basic literacy class in this site was held in the school building, which, it is noted, was small and not conveniently located. (It is not unusual in rural areas of Nepal for the schools to be located away from the villages, in an effort to make them more equidistant from a greater number of villages so that more children have access to the school. This often results in schools seeming to be, literally, in the "middle of nowhere", away from houses and village centers, and it often ends up making the schools farther for almost everyone.) The average distance to class was 20 minutes walk, and the enumerator noted that the houses in this village were scattered (rather than clustered close together). The class met from 3-5 in the afternoon, probably

because there is no electricity in this site and the school would have been occupied during the earlier part of the day. The class itself, strangely, received an "OK" rating, with a blackboard and good light, even though the participants sat on the floor. The class met for 254 hours (5 1/3 months), with a mean number of hours of 204 and a median of 220, or almost five months of instruction; participation was categorized as "regular". The post-literacy class met for a total of 64 hours (out of the scheduled 75 hours or 12 weeks intended for the course), with a median of 54 hours, or 9 weeks, of instruction. The facilitator was male, and the enumerator noted that the participants stated they would rather have had a female. In general, they seemed not to have thought much of the facilitator, claiming that he did not provide "good teaching". The facilitator's activity level was rated as "medium-to-low", and the enumerator noted that the class only finished Book 3 out of four books. The facilitator had not passed his School Leaving Certificate test. Five out of 25 participants dropped out, for a moderate drop-out rate of 20%. The CHV in this site was rated as very active; she assisted in the class and helped participants, and most participants seemed to respect her. Otherwise, no information is known about her. The class was supervised 9 times. Literacy achievement in this site ranked third out of 9, and health knowledge scores third out of 10.

Site Seven non-formal education context. The basic literacy class in this site was held in the old government buildling (the post-literacy class was held in the primary school). The participants sat on the floor, but the center received a "good" rating from the enumerator, probably because there was a blackboard and adequate light, since there is electricity in this site. The class was held from 7-9 p.m. The average distance to class was

16 minutes, although the area is fairly hilly so it meant quite an uphill/downhill walk for many participants. Despite this, participation was regular, according to the enumerator, and the class met for the full six months (286 hours), with an average of 208 hours of instruction; the median hours was 214, or about 4 ½ months of instruction. The post-literacy class met for 86 hours (higher than the intended 75 hours), with a median of 72 hours, or twelve weeks. The basic literacy class had two facilitators: the first was female, but then she married and moved away, and the second was a male with an SLC-pass level of education. The drop-out rate was only 3 out of 28 (11%) which is a low rate of attrition. The activity level of the second facilitator was rated as "high" and diligent, even though he had to walk one hour each way to attend the class. The female CHV in the village was also a member of the class, and she was reported to be very active, encouraging women to join. The class was supervised 10 times, the largest number of supervisor visits of any of the literacy classes in the study. This site was ranked first out of all of the nine sites in literacy achievement, and second out of ten on health knowledge acquisition.

Site Eight non-formal education context. The literacy class in this site met in the primary school, which the enumerator claims was not "suitably located". Although average distance to class was only 11 minutes, the houses are scattered far from each other. The center was rated poorly, even though there was a blackboard and benches to sit on, probably because there is no electricity in this village and the class was held in the evening from 7-9 p.m. The lighting must have been quite bad for studying. The drop-out rate was moderately high (5 out of 27, or 18%). The facilitator was a male, with less than

an SLC-pass level of education. The level of activity for the facilitator was rated as extremely low; according to the participants, they didn't particularly like him or his style of teaching, and he was often absent. Incredibly, the enumerator's notes indicate that the facilitator lived 8 hours walk away from the class! Possibly because of this, the class met for only a total of 99 days (198 hours), with an mean of only 164 hours of instruction for those who completed; the median hours was only 170 (3 ½ months). The post-literacy class met for 74 hours, with a median of 70 hours (almost 12 weeks of instruction); it is unclear whether the facilitator for the post-literacy course was the same facilitator who taught the basic course. The basic literacy class was only supervised 2 times (rather than the recommended 12 times), probably because the village is 3 ½ hours walk from the nearest road and very remote. The female CHV was a member of the class who encouraged other women to join, and the enumerator noted that she was providing health education in the village. This may be part of the reason why, even though the class met for less time, this site had the highest mean health knowledge score, ranking first out of the ten sites, and, despite the low number of hours the literacy class met, this site ranked second out of the nine sites on literacy acquisition.

Profile of Group Four: Comparison Group

Very unfortunately, little is known about the comparison group or the comparison group sites. The enumerator's reports, as well as the interviews with village leaders, etc., are missing (or were never written) for these sites. All that is known is that one of the comparison group sites is in Ilam (the district where Group 2 Literacy only classes were

held) and the other comparison group site is in Makwanpur (the district where Group 1 CHV/Health only and Group 3 HEAL subjects were tested). The average age of the comparison group was 26, and 78% of the women were married, with an average of 2.8 children. Three-quarters of the comparison group subjects were Tamang, and 20% were Brahmin. Only 1/4 of the comparison group participants speak Nepali as a first language. Only 6% of the subjects had previous schooling; however, this average represents 12% in one site, and 0% in the other. 36% of comparison group subjects owned a radio. The two sites varied in terms of distance to road or services: one site was not particularly remote (7 minutes walk to the road, 30 minutes to the health post) while the other was more remote (1 ½ hours walk to the road, 2 hours to the health post). Other than this, there is no information about the education, economic, or development status of these two villages. The two sites ranked ninth and tenth out of ten on health knowledge score, and the one comparison group site for which we have literacy scores ranked eighth out of nine on literacy (one of the CHV/health only sites in Group 1 ranked lower, probably because some of the women in this comparison group site had attended school).

Discussion

In general, the CHV/health-only group subjects and the comparison group subjects are similar in composition, with more subjects being married and with more children, whereas the two literacy course groups are similar to each other in age, marital status and number of children. However, the differences between groups are most pronounced in terms of ethnic composition and first language, such that the CHV/health only group has a

larger percentage of Brahmin/Chhetri subjects and Nepali first language speakers than the other three groups. Group 1 is also different than the other three groups in percentage of subjects with previous education (either schooling or a previous literacy class). The greater number of women who were schooled in the CHV/health-only sites probably goes hand in hand with the greater numbers of Brahmins, because this caste tends to have a higher socio-economic standing than other castes and has more of a tradition of schooling their girls. Group 1 sites also seem to be generally more prosperous, with more access to services such as electricity and water, than are the sites were literacy classes were held.

Dropouts, as a subset of the sample (n=27), tend to be older, with fewer radios, living farther from the road, the health post and the class than basic course completers. Factors significantly correlated with dropping out include distance to class (-.32, p=.000) and radio ownership (.23, p=.02). Participating in the PCRW literacy classes is also associated with dropping out (.19, p=.03). Other variables, such as number of children, age, and first language, were not associated with dropping out.

Given the context in Nepal, where it would be extraordinarily difficult to match subjects with similar combinations of factors such as ethnic group, age, distance to health post, and radio ownership, this data set provides information about reasonably comparable groups. The greatest divergence is probably between the CHV/health only subjects in Group 1 and subjects in other groups, given the difference in caste and educational background. The analysis needs to take this difference into consideration when comparing differences in effectiveness of non-formal education approaches. The differences between sites, while they vary on a number of factors, are not so great as to dismiss the hypotheses

that emerge from their comparison. Overall, differences between groups, sites and subjects are not so large that, for the purposes of this exploratory study, the findings should be suspect. At the very least, the groups are comparable enough to develop hypotheses for more refined research about the effects of different non-formal education approaches.

CHAPTER 5

LEVELS AND APPARENT PREDICTORS OF LITERACY SKILL ACQUISITION

Questions and Hypotheses

This section presents the findings on women's literacy acquisition as it relates to the primary research questions, the first of which aims to investigate the extent of difference in literacy skills gained between women who receive literacy instruction only, women who receive literacy instruction with a health focus, women who receive health instruction only, and women who receive no non-formal instruction at all? The specific hypotheses being tested as part of this first question include the following:

- Women who participate in some type of non-formal education will acquire more literacy skills than women who have not participated in non-formal education.
- Women who participate in an integrated health/literacy program will acquire more literacy skills than women who participate in a "literacy only" program.
- Women who participate in a post-literacy/health program will acquire more literacy skills than women who participate in a basic-level non-formal education program.

This section also investigates the second of the two primary research questions, which aims to identify some of the factors or "influences" that might explain possible differences between groups. It is important to determine whether and which other individual, class-related or community-related factors, besides non-formal education

approach, in order to consider why such factors may influence literacy acquisition. The specific hypotheses being tested as part of this second question include the following:

- Individual factors may influence literacy skill acquisition.
- Literacy skill and health knowledge acquisition are interrelated, such that women who acquire more literacy skills will also acquire more health knowledge.
- Class-related factors may influence literacy skill acquisition.
- Community-related factors may influence literacy skill acquisition.

Methods

First, means testing and ANOVA was used to determine whether differences exist between groups, and, specifically, whether literacy skill acquisition was related to type and level of participation in non-formal education. Means testing was also used to see if HEAL post-literacy completers had significantly higher literacy scores than did basic course completers, and paired sample t-tests were run to determine whether gains in literacy skills, within subjects, were significant for those HEAL participants who completed both basic and post-literacy courses. Multiple regression was used to uncover any demographic or class-related factors that can be used to predict individual achievement in literacy. Differences between groups were then re-tested controlling for any significant individual factors.

To determine whether class-related or community-related factors that may have influenced literacy skill acquisition, a qualitative analysis was made (using a matrix of information about each class and community in the five literacy class sites), and using

cross-case analysis. For this analysis, the mean literacy scores (after the basic course) were ranked by site, and, against these rankings, each of the class-related and community-related factors were considered across all the sites to see if there were patterns of factors that seem to be consistently related to high or low scores. Patterns that emerged were used to generate hypotheses about the role that contextual factors may play in affecting subjects' acquisition of literacy skills.

Findings

Non-formal Education Intervention

A one-way ANOVA test of differences in literacy scores indicates a significant difference (p=.000) between groups. The highest scoring group--the HEAL post-literacy completers, with up to 9 months of literacy instruction--scored an average of 87 out of 120 possible points, compared to the comparison group--with no literacy instruction--who scored an average of 4 points. It is also clear that CHV/health-only subjects as a whole did not score much lower on the literacy test than did those literacy-only participants who completed a six-month course. Post-hoc tests (Tukey-HSD, Scheffe and LSD) on differences between specific groups show that the differences between groups are significant at the .05 level between the comparison group and every other group, between literacy-only or CHV/health-only and both HEAL groups, and between HEAL basic and HEAL post-literacy. At first glance, those women who attended the integrated health/literacy course performed significantly better on the literacy test than did those in

the other groups. The additional three-month post-literacy course made a significant difference in literacy acquisition. Table 5.1 presents an overview of the literacy scores for the whole sample, by group (without dropouts):

Table 5.1 Mean Literacy Scores, by Group

Group	Mean Literacy Score	s.d.	N
1: CHV/Health	20.38	32.97	60
2: PCRW/Literacy only	29.40	19.01	35
3: HEAL basic	47.18	22.64	56
4: Comparison	3.76	11.64	25
5: HEAL post-literacy	86.85	19.17	33

Participation Level

One would assume that those who complete a basic literacy course would acquire more skills than those who drop out of the course, but that those who drop out acquire more skills than those who never attended at all. The hypothesis being tested here is the first hypothesis that women who attend non-formal education will acquire more literacy skills; that is, time attending a literacy class will have a positive relationship to literacy skill acquisition. This is an important question, since it is reasonable to expect those who drop out to receive some small benefit in terms of literacy skills acquired compared to those who never attend. To test this hypothesis, ANOVA was used to compare the scores of

drop-outs and completers in Groups 2 and 3 (who received specific literacy instruction) with the scores of those in the comparison group and the CHV/health-only group.

Participation level did affect literacy achievement. Drop-outs did acquire literacy skills, as compared to those of the comparison group, with HEAL participants acquiring more skills before dropping out than PCRW/literacy-only participants. HEAL participants who completed the basic course and then enrolled in the HEAL post-literacy class (whether or not they finished) acquired more literacy skills in the basic course than did other basic course completers who did not go on to join the post-literacy course, an indication that the best students from the basic course go on to join and complete the post-literacy class. Significant differences between groups are between "completers" as a whole and the comparison group, and between those HEAL participants who would go on to complete the post-literacy course and every other group. Table 5.2 shows the difference between literacy score means among drop-outs and completers:

Table 5.2 Literacy Scores After the Basic Course, By Participation

Participation Level	Literacy Score	s.d.	N
All drop-outs of basic literacy course	**18.20**	**20.05**	**25**
Group 2 Literacy only	15.64	21.46	14
Group 3 HEAL	21.45	18.60	11
Completed basic literacy course	**30.50**	**20.02**	**50**
Group 2 Literacy only	29.40	19.01	35
Group 3 HEAL	33.07	22.71	15
Completed HEAL course, drop out of post-literacy	**39.67**	**20.76**	**9**
Completed HEAL basic and HEAL post-literacy*	**55.91**	**19.34**	**32**
CHV/Health only	20.38	32.97	60
Comparison Group	3.76	11.64	25

*This is the basic literacy score, after the six-month course, for those who would go on to complete the post-literacy course.

The fact that drop-outs were not significantly different from completers as a whole is an indication that even those literacy course participants who drop-out less than 1/3 of the way through the course still acquire some literacy skills. The fact that CHV/health-only subjects were not significantly different from literacy course completers is related to the previous literacy or schooling to which many in the CHV/health-only group had been exposed. The finding that those who tended to go on and complete the post-literacy course were also those who scored highest at the end of the six-month course is supported by the high correlation between literacy score after the basic six-month course and literacy score after the 3-month post-literacy class, for those participants in Group 3 who completed both, which is .69 ($p=.000$), indicating that those who did well in the basic course also tended to do well in the post-literacy course.

A paired sample t-test of 28 HEAL participants who completed both the basic course and the post-literacy course (and for whom have both basic and post-literacy course test data) demonstrates that participation in the HEAL post-literacy course significantly increases literacy acquisition. These 28 participants had a mean literacy score of 57.21 after the basic literacy course and a mean post-literacy score of 88.25 after the HEAL post-literacy course. That 31 point difference is significant at the .05 level.

The Influence of Previous Education

Since 19% of CHV/health-only subjects had attended school at some point in the past, and 30% had attended a previous literacy class, it is important to test whether the differences in the groups still apply when taking into account previous education. Although there is missing data on some individuals, there are literacy test scores for most of those who completed a previous literacy course or who attended school, so it is possible to compare their literacy scores to the scores of literacy-only and HEAL participants to see whether previous education makes a difference in literacy achievement. Unfortunately, there is no information about the type of literacy course previously attended by CHV/health-only subjects, and for CHV/health-only schooled subjects the data set gives only grade completed, which ranged from grade 2 to grade 8. Information is unavailable about the total number of school years completed by subjects in Groups 2, 3 and 4; the only information available is that they did or did not attend school. No HEAL basic course completers are recorded as having had any previous education or schooling.

The null hypothesis being tested is that previous education (whether schooling or non-formal literacy education) has no effect on literacy achievement; we should expect this to be rejected since we already know that there is a significant difference between the comparison group and the CHV/health-only group. Are the literacy skills of those participants who attended school or a literacy class previously better than the literacy skills acquired by those who completed the health/literacy class in particular? ANOVA and means tests were used to determine differences between groups, controlling for previous education.

Overall, those who had previously attended school performed better than those who did not, and the schooled participants in Group 1 and Group 2 demonstrated more literacy skills than did the literacy course completers in Groups 1, 2 and 3; however, schooled subjects in the comparison group had a lower mean than the mean for literacy course completers overall. Surprisingly, those CHV/health-only subjects who had previously attended a literacy class scored higher on the literacy test than the literacy-only subjects but about the same as the HEAL basic completers. There is no significant difference between HEAL basic and CHV/health-only subjects with previously-acquired literacy skills or with schooling (separately or together); however, both of these groups did significantly better on the literacy test than the subjects in the PCRW/literacy-only group or the schooled comparison group subjects. Those women who completed the HEAL post-literacy class had a mean score higher than the schooled women in Groups 1 or 2, and this difference was significant. Table 5.3 presents the means for the various groups, according to previous education:

Table 5.3 Literacy Scores of Subjects, By Educational Experience

Groups	Literacy Score	s.d.	N
Group 1: CHV/health ed only	**20.38**	**32.97**	**60**
With no previous education	.84	4.77	37
With previous literacy class experience	44.23	34.24	13
With previous schooling	61.70	34.39	10
With either previous lit or schooling	51.83	34.66	23
Group 2: Literacy only (PCRW classes)	**29.40**	**19.01**	**35**
With no previous schooling	27.19	18.22	32
With previous schooling	53.00	9.17	3
Group 3: Health/literacy (HEAL) basic	**47.18**	**22.64**	**56**
Group 4: Comparison Group	**3.76**	**11.64**	**25**
With no previous schooling	0.00	0.00	22
With previous schooling	31.33	10.48	3
Group 5: Health/literacy (HEAL) post-literacy	**86.85**	**19.17**	**33**
With no previous schooling	88.69	18.25	29
With previous schooling	73.50	23.30	4

On the basis of these results, it would be wrong to conclude that, at least at the basic literacy level, the HEAL course is superior to a "literacy only" non-formal education approach, since CHV/health-only subjects who had previously attended another type of literacy course performed as well as subjects who completed the HEAL basic course. However, it is interesting to note that those who finished the HEAL basic course did not do worse than those in the CHV/health-only group or the comparison group who had attended school, an indication that the HEAL basic course at least helps subjects approximate the literacy skills gained in school.

The most striking result, however, is the significant difference (p=.000) in literacy acquisition between those who had completed the HEAL post-literacy course and every

other group. Their literacy test scores were significantly better than both the HEAL basic and the CHV/health-only previously-educated women, including those who had attended school. Limited information is available about the level of schooling of 10 women in the CHV/health-only group: the level of schooling for those women for whom we have both literacy scores and information about level of schooling ranges from completing grade 2 to completing grade 8. The average level of schooling for these 10 women is 4.0 years completed. While there is more variability in literacy score for the schooled women in Group 1 than for the post-literacy completers in Group 3, the difference in their mean scores (61.70 vs. 86.85) encourages the hypothesis that completion of the post-literacy class helps women acquire relatively more literacy skills than the skills retained by those women who completed four years of schooling. Thus, it appears that participation and completion of the nine-month HEAL course helps women acquire significantly better literacy skills than does schooling or participation in only six months of non-formal education using any other approach.

Thus, although it seems that participation in the HEAL course makes a significant difference in literacy acquisition scores compared to the PCRW/literacy-only subjects, the HEAL course in and of itself does not appear to be significantly more effective in imparting literacy skills when compared to those subjects in CHV/health-only group who had taken another literacy course in the recent past. It is always possible that there is something about the health education received by those women in the CHV/health-only mothers' groups that helps them improve their literacy skills. In other words, it is conceivable that women in the CHV/health-only group who had attended a previous

literacy class finished that class with literacy skills similar to the PCRW/literacy-only subjects but, through the process of participating in health education, they improved their literacy skills to a level comparable with the skills of HEAL basic course completers. This seems unlikely, however, given the probable low use in Mothers' Groups of health education materials that could help women improve their reading and writing skills, but it is not impossible, and future research should account for the literacy skills of women before and after receiving health education only.

These results do, however, indicate that completion of the additional three-month HEAL post-literacy course adds significantly to literacy skills acquired in the HEAL basic course, and these skills may be superior to those acquired through schooling. Thus, although the number of schooled subjects in the study is small, one hypothesis emerging from this data is that the integrated six-month basic health/literacy (HEAL) course helps women acquire literacy skills at least equivalent to those retained by women who went to school as girls. Further research should control for years of schooling since the initial intensity of literacy acquired by girls in school may have implications for their retention of literacy skills over time.

Individual Factors Related to Literacy Skill Acquisition at the Basic Level

This section presents the results of multiple regression tests, investigating the hypothesis that certain individual factors, such as age, first language, distance to class, radio ownership, etc., may influence women's literacy skill acquisition. In order to test the

hypothesis that individual factors may influence literacy skill acquisition, correlations and multiple regression were conducted with Group 2 and Group 3 subjects' data to determine if any of the individual demographic variables (such as age, number of children, first language, etc.) or quantitative class-related variables (hours of instruction, distance to class) can account for differences in literacy skill achievement. This analysis applies only to those subjects who participated in a non-formal education approach where literacy was a component. The individual factors included as independent variables in this analysis were marital status, age, language, ownership of radio, hours of instruction in the literacy class, distance from home to road, distance from home to health post, distance from home to class, and type of literacy class/non-formal education, with literacy test score as the dependent variable.

From these correlations, it appears that group membership (whether the subject participated in the literacy-only or the HEAL classes), hours of instruction, and language (whether the subject spoke Nepali as a first or second language) were the variables with the strongest correlation to acquisition of literacy skills. Marital status and radio ownership also demonstrated a significant correlation to literacy skill acquisition. Since language correlates strongly with group membership, and hours of instruction correlates strongly and negatively with distance to the road and to the health post and with age, the multiple regression analysis is needed to disentangle these factors and identify the strongest predictor(s) of literacy achievement. It is interesting to note, however, that neither age nor distance to class showed a significant relationship to a literacy course participant's achievement. Table 5.4 presents the simple correlations between literacy

score at the end of the six-month literacy course (PL1) and individual demographic variables:

Table 5.4 Variables Related to Basic Literacy Achievement
(N=89)

	PL1	Mar. Status	Hrs. Inst.	Age	Radio	Dist. Road	Dist. to HP	Dist. Class	Lang
PL1	--								
Mar. Status	-.23*	--							
Hrs Inst	.34**	-.25**	--						
Age	-.15	.60**	-.18*	--					
Radio	.20*	-.09	.14	.05	--				
Road	-.03	.14	-.32**	.15	-.04	--			
HP	-.11	.13	-.39**	.17	-.09	.84**	--		
Dist Cl	.10	.10	.09	-.14	.08	-.23*	-.22*	--	
Lang	.25**	-.17	-.01	-.17	.02	.23*	.11	-.12	--
Group	.38**	.05	.12	.02	.33**	.22*	-.05	.01	.25**

*Significant at .05 level.
**Significant at .01 level.

Multiple regression of these factors against literacy achievement for those two groups (Group 2 literacy-only and Group 3 HEAL) who participated in literacy classes (excluding dropouts), using all the above variables in the regression, indicates that only group and hours of instruction emerge as significant, above and beyond the other variables. Language, marital status and radio ownership do not emerge as significant

predictors of literacy achievement; membership in the Brahmin/Chhetri caste, which correlates highly with literacy achievement, also does not emerge as a significant predictor. The multiple R for all variables is .56 (p=.001), and R square (.314) indicates that these variables together account for 31% of the variance.

Table 5.5 presents beta weights and their significance, in ranked order, for the variables presented above, including caste (for which there is no simple correlation because there are three caste groupings):

Table 5.5 Results of Multiple Regression on Basic Literacy Achievement (N=89)

Variable	Simple Correlation	Beta Weight	T	Sig T
Group	.38**	.312	3.12	.0118*
Hours of Instruction	.34**	.279	2.58	.0119*
Caste	-.28**	-.166	-1.31	.1945
Marital status	-.23*	-.135	-1.06	.2914
Distance to health post	-.11	.196	.99	.3234
Language	.25**	.104	.89	.3835
Distance to road	-.03	-.151	-.73	.4702
Radio ownership	.20*	.072	.68	.4969
Caste2	.01	-.039	-.34	.7377
Age	-.15	.023	.19	.8514
Distance to class	.10	.018	.18	.8612

These results indicate that greater literacy skills can be acquired by participation in the HEAL course, as opposed to participation in the PCRW/literacy-only course, and through greater hours of instruction. Individual demographic variables, (e.g., caste, marital status) do not emerge as significant predictors of how well someone will acquire literacy skills during a basic literacy course. Two of our four tested hypothesis are thus disproved by this analysis: age, by itself, does not negatively affect literacy achievement, nor does speaking a first language other than Nepali. Higher achievement in basic literacy does seem to be possible through participation in the HEAL approach (vs. the PCRW approach) and through more hours of instruction. However, it might not necessarily be the integrated approach that is better, since CHV/health-only subjects who had previously attended another non-formal literacy course performed as well as HEAL participants. It could be that the HEAL program implementation is simply better than PCRW's implementation. This flaw in the study design need to be corrected in future research in order to determine whether it is the integrated literacy approach itself rather than the HEAL implementation that is superior, by comparing HEAL course completers with those who complete courses run by a number of different organizations. In addition, future research should disentangle the possible effects of the HEAL project as a pilot project, compared to an on-going literacy program like PCRW, since pilot projects may have both negative factors (being new and untried systems for conducting the project) and positive factors (smaller coverage and greater resources) affecting them. Future research could also shed light on whether integration of literacy with other types of content (economic

development, agriculture, environmental education, for example) positively affects literacy acquisition.

Individual Factors Related to Literacy Skill Acquisition at the Post-literacy Level

Although the issue of whether type of non-formal education affects literacy skill acquisition at this level is moot (since only data from participants who completed a HEAL post-literacy class is available), it is still possible to investigate whether the same types of factors (e.g., hours of instruction) that affect women's literacy achievement in the basic class will also affect their achievement in the post-literacy class. Is it simply a matter of more hours of instruction that makes the difference in skills acquisition, or are there other, individual factors that become important at the post-literacy level, specifically age, marital status, first language, radio ownership, literacy acquisition level in the basic course, or distance to road, health post or class? If other types of factors emerge as significant, then this may require us to propose new hypotheses about the difference between the basic course and the post-literacy course experience.

Multiple regression looking only at those participants who participated in and completed the HEAL post-literacy classes is impossible because of the small sample size (n=28). Therefore, bi-variate correlations are presented to identify which variables are important to literacy acquisition at the post-literacy level. The correlation matrix indicates that distance to class, distance to road, and distance to health post show a significant relationship to literacy achievement at the post-literacy level (PL2);

interestingly, distance to class shows a positive relationship such that those who lived farthest from the class performed better on the literacy post-test. Radio ownership and basic literacy test score (PL1) also correlated to literacy achievement. Table 5.6 presents simple correlations between literacy and individual variables at the post-literacy level:

Table 5.6 Variables Related to Literacy Achievement, Post-literacy Level
(N=29)

	PL2	Mar. Status	Hrs. Inst. PL	Age	Radio	Dist. Road	Dist. HP	Dist. Class	Lang
PL2	--								
Mar. Status	-.27	--							
Hins PL	.11	-.39*	--						
Age	-.21	**.67****	-.12	--					
Radio	.43*	-.27	-.07	-.01	--				
Road	**-.70****	.44*	.10	.41*	**-.56****	--			
HP	**-.63****	.49**	.05	.44*	**-.57****	**.96****	--		
Dist Cl	**.39***	-.31*	-.33	-.26	.19	**-.60****	**-.55****	--	
Lang	-.06	.33	.03	.08	-.16	.19	.20	**-.46****	--
PL1	.38*	.19	.14	-.01	-.04	-.18	-.16	.08	.13

* Significant at .05 level.
**Significant at .01 level.

Thus, even though hours of instruction emerged as a predictor at the basic literacy level (for the six-month course), neither the number of hours a participant attended the post-literacy course, nor how well she did in the basic course, was a predictor of how well

she would acquire literacy skills at the post-literacy level. Radio ownership seems to be important to literacy knowledge acquisition at this level, and the distance a subject lives from the road and health post could be important to literacy knowledge acquisition at the post-literacy factor even though they did not emerge as important factors at the basic level.

Relationship between Literacy Score and Health Score

The hypothesis being tested in this section is that literacy skill acquisition and health knowledge acquisition are related; specifically, that women who acquire a high level of literacy skills will also acquire a high level of health knowledge. In other words, it is not an accident that those subjects who are successful in acquiring skills are also successful in acquiring knowledge, indicating that some participants are better overall students who will do well in both skills and knowledge.

There was a strong correlation (.39, p=.000, n=201) between the scores on the basic literacy test and the health knowledge test for all participants (excluding those who dropped out of the literacy course in Groups 2 and 3). Similarly, the correlation between health knowledge and literacy scores among those who completed the 3-month post-literacy test is .41 (p=.003, n=33), indicating that those who tended to do well in literacy also did well in health knowledge. The results indicate the possible role of self-selection in joining and staying in the literacy class, such that those who feel confident to learn or who

feel successful early in the non-formal education experience feel encouraged to stay and achieve greater skills and knowledge than their peers.

A multivariate analysis of the 201 subjects who had both literacy and health knowledge scores indicates that the difference between the groups overall is significant when both dependent variables are considered together. Specifically, significant differences in literacy acquisition exist between Group 2 and the comparison group and between Group 3 and the comparison group when health knowledge is controlled for. There are no significant differences between the non-formal education participants in literacy skill when health knowledge is taken into account. The only significant difference in health knowledge is between Group 2 (literacy only) and Group 3 (HEAL) when literacy is controlled for. Significant differences in health knowledge do not exist between the CHV/health-only group and any of the other groups (including comparison) when literacy is taken into account. In other words, literacy instruction is related to greater literacy skill acquisition, controlling for health knowledge, only when compared to the comparison group; and, taking into consideration literacy skills, the health knowledge acquired by HEAL participants is significantly better than that acquired by PCRW/literacy-only participants. HEAL participants are not significantly different from CHV/health-only subjects in literacy skills when health knowledge is controlled for, nor in health knowledge when literacy skills are controlled for. These results demonstrate the connection between literacy instruction and achievement in literacy, and they provide strength to the argument that the HEAL participants gained more health knowledge vis-a-vis their literacy skills acquisition than did the literacy-only participants. It also lends support to the argument

that, at the basic level, there is no great difference between the HEAL course and schooling or previous literacy plus health education through the Mothers' Group.

Qualitative Analysis of Class and Community Factors Related to Literacy Skills Acquisition

Although there is overall a difference in the acquisition of literacy skills by non-formal education approach, it is important to look at the difference between sites, since each class within any given approach has a different configuration of factors: the teacher in one may be better, the class may have met for longer than another, or one class may have better facilities than another. Post-hoc analysis of site differences indicates that HEAL Site 7, with a mean score of 57.53, is significantly different from both literacy-only sites, but mean literacy scores in the other HEAL basic sites are not significantly different from PCRW/literacy-only classes. In other words, the highest-ranked site was significantly different in literacy acquisition from the fourth and fifth ranked classes but otherwise site differences were not significant. Overall, hours of instruction (which seems to be the key variable in literacy acquisition) was a significant individual factor in literacy acquisition, but even controlling for that, site is significant. Thus, it is important to look closely at the qualitative differences between sites to ascertain the reason for the differences between them; this analysis is related to the hypotheses about class-related and community-related factors and their possible influence on women's literacy skill acquisition. Table 5.7 presents literacy score means by site:

Table 5.7 Mean Literacy Scores, by Site

Site	Mean Literacy Score	s.d.	N	Rank after Basic Course
CHV/Health only				
Site 1	29.61	36.07	23	--
Site 2	2.44	5.97	16	--
Site 3	23.95	37.14	21	--
Literacy only				
Site 4	21.71	21.29	14	5
Site 5	34.52	15.84	21	4
HEAL basic				
Site 6	39.44	21.01	18	3
Site 7	57.53	19.21	19	1
Site 8	44.16	24.46	19	2
Comparison Site 9	3.76	11.64	25	--
HEAL post-literacy				
Site 6	84.33	12.33	9	--
Site 7	102.31	8.23	13	--
Site 8	70.64	19.18	11	--

There are explanations for some of these results. Site 2 and Site 9 scored low, obviously, because no literacy class was held in these villages and most of the women in these sites had not attended school. Literacy scores in the other two CHV/health-only sites are high because many of the women there had either attended school or a previous literacy class. But why did Site 4 score so much lower than the other literacy classes, and what factors could account for the higher literacy scores in Site 5? The following qualitative analysis will help to provide possible explanations for the differences in literacy acquisition between these sites.

Influence of Class-related Factors on Literacy Skills Acquisition

The data set provides information, although it is incomplete for some sites, about the time of the class, the location and quality of facilities, the gender and education level of the facilitator, the dropout rate, the activity level of the facilitator and (in some cases) the CHV, and the number of times the class was supervised. Information about these factors was considered along with the literacy score ranking of the site to see if any of these classroom factors may have influenced literacy acquisition. This qualitative analysis includes the five literacy sites (Sites 4 and 5 of the PCRW/literacy-only approach and Sites 6, 7, and 8 of the HEAL basic class), with special attention to the differences between Site 7 and Sites 4 and 5 to determine whether any factors could explain the significant differences between these sites.

There seems to be no real pattern in class configuration that would explain literacy acquisition differences between sites. Classes were held at all different times of the day (morning, afternoon, evening and night), and the two classes held at night (7-9 p.m.) ranked higher than the afternoon classes; the only morning class ranked lowest. Presence of electricity does not seem to be a factor, since one of the night classes had electricity and the other did not and both classes performed well. Three of the classes were held in schools, and two in government buildings, but with no relation to ranking. Enumerators gave a subjective ranking to the class facilities, which seems to be a composite rating related to presence of a blackboard, benches and electricity: one site received a ranking of "poor", three received "OK", and one received "good"; although the only center ranked "good" (even though the participants sat on the floor) did receive the highest literacy skill

ranking, the only center rated "poor" received the second highest ranking. The closeness of the class site to participants' homes (as determined by mean distance to class) also seems not to be a consistent influence. Finally, the number of times the class was supervised fluctuates across all rankings: the highest- and second-highest ranking sites in literacy scores were supervised the most and the least, respectively.

Participation in the class also seems to show no real pattern that would explain differences in literacy scores. Both the highest and the lowest-ranking classes were listed as having "regular participation", and the first-ranking and second-ranking classes had the highest and the lowest mean hours of instruction, respectively. Total hours of class meeting also did not seem consistently related to literacy score.

The only classroom context factor that seems to show a pattern influencing literacy acquisition is the facilitator. The only facilitator with an educational level of SLC pass was the facilitator for the highest-ranking class in literacy scores. The other facilitators did not have an SLC pass-level education. The top three sites also had male facilitators; the lowest two-ranking sites had female facilitators, which may also interact with education level, since Nepali males in general tend to attend school for more years, regardless of whether they pass the SLC or not. Also, all HEAL facilitators were male, and both PCRW facilitators were female, so the "gender" effect may simply be a result of the non-formal education approach. The possibility that the facilitator's education level may have some impact on participants' literacy achievement is evident in a quote from the enumerator who collected data in HEAL/Site 6: identifying the participants' attitudes towards the class facilitator, the enumerator writes that "some even praised him more

since he was more educated than Meera (the previous facilitator, who left to get married) and could teach better." It is possible that participants have more confidence in a facilitator with more years of education, whether or not he is a better teacher, or in fact that those teachers with more education are better teachers. It is also possible that the commitment and respect shown for participants also may play a factor, since the highest-ranking class had a facilitator who was categorized as demonstrating "high activity level" and as being very "diligent", walking one hour each way to get to and from the class each day. However, the pattern of facilitator behavior is not consistent, since the second and third-ranking sites had male facilitators who were categorized as demonstrating "low activity level" and as not being very well liked by the participants. Even more puzzling is that one of the facilitators is stated as living an eight-hour walk from the class and as being often absent, yet his class had the second-highest mean literacy score.

Therefore, the only pattern in the classroom contextual factors that seems relevant to differences in literacy score achievement across sites is some feature of the facilitator. This feature may be the educational level of the facilitator (either because it makes him/her a better teacher or because the participants have greater confidence in more educated facilitators), the gender of the facilitator, or the respect and commitment shown by the facilitator. Further research should investigate the relationship between facilitators' teaching style, the confidence participants feel in the teacher, the gender of the facilitator, and the literacy performance of the participants. Other facilitator-related factors, about which we have no information from this data set, may also play an important role, such as the caste and language of the facilitator (and whether these are the same as the majority of

students), the age of the facilitator, and the status of the facilitator in the community, all of which may affect participants' willingness to come to class and thus their acquisition of literacy skills.

With regards to the relationship between class-related factors, literacy skill acquisition and drop-out rates, some weak patterns emerged as worthy of further investigation. Class-related factors (such as quality of facilities, time of class, gender of facilitator, mean hours of instruction, number of times supervised, presence or absence of a non-formal education committee) presented no explanation for differences in drop-out rates. Although individually distance to class may have been a predictor of drop out, mean distance for the class as a whole, considered against literacy ranking by site, did not show a pattern of influence. However, there may be some connection between class location and drop-out rate; the two literacy classes with low drop-out rates were both held in government buildings, whereas the classes held in schools had higher drop-out rates, regardless of the facilities (benches, electricity, etc.) or the distance to class. There may also be a connection between drop-out rate and literacy scores, class by class: generally, the lower the drop-out rate, the higher the mean literacy score, so that the class with the lowest drop-out rate (Site 7) had the highest literacy score, and the class with the highest drop-out rate (Site 4) had the lowest mean literacy score of any of the literacy classes. There may be some interaction here with the education level and the activity level of the facilitator, since the facilitator with the highest education level (SLC pass) and the highest reported activity level also had the class with the lowest drop-out rate (11%). Similarly, the total amount of time that the class met may be a factor, since the two classes (Site 5

and Site 7) with the highest total hours of instruction also had the lowest drop-out rate. Perhaps not coincidentally, these two sites (one PCRW and one HEAL) had the highest literacy performance within their respective groups. These results lend credence to the hypothesis that the facilitator is a key factor in both the drop-out rate and the literacy performance of the class, the hypothesis being that some combination of education level, gender, activity level or commitment affects drop-out rate or performance, with drop-out rate and literacy rate interacting. Future research investigating drop-out rates should collect more detailed information about the facilitator, the participant's perception of the facilitator, and the interaction between the facilitator and the participants.

Influence of Community-related Factors on Literacy Skills Acquisition

Community information for Groups 2 and 3, again incomplete for some sites, is available about the remoteness and size of the village, ethnic composition and predominant language, availability of water and electricity, presence of latrines, and presence of a non-formal education committee (whose task it is to support the literacy classes). Other contextual information is extremely sketchy.

There seem to be no real pattern indicating a consistent influence of community factors on literacy acquisition. The remoteness of the village seems not to be important, since in both less and more remote sites participants scored well. Both large (140 households) and small (62 households) communities scored well. Neither the availability (or lack thereof) of water, electricity, or latrines seems to have had an effect on literacy acquisition, and the types of crops grown was very similar across all sites (maize and

millet). Whether or not there was a non-formal education committee set up to assist the class seemed to make no difference, as the first and third-ranking sites in literacy had no committee, but other sites did. Information about house construction, recent development activities, and children's attendance in school is too sketchy to draw clear conclusions.

Although the number of sites is small, two patterns do seem to emerge as possibly significant factors in literacy skills acquisition. The first is the predominant language of the village, perhaps interacting with the ethnic composition. Even though the composition of the HEAL sites is mostly Magar and Tamang, and the quantitative data indicates that the majority of participants claimed that they did not speak Nepali as a first language, the enumerators indicate that in these sites, many participants spoke Nepali well. When looking at enumerators' notes across sites, it appears that where participants spoke Nepali, literacy scores were higher, and the lowest-ranking site in literacy acquisition was PCRW/Site 4 where most participants speak Lapcha. This highlights a flaw in the demographic questionnaire, since information about one's first language does not provide information about how well one speaks second or third languages, nor what language one uses in daily life. It is also unknown to what extent the literacy class, because the materials are in Nepali, has positively affected participants' ability to speak Nepali even if they didn't speak it well before joining the class. Thus, even though there seems to a pattern here which could indicate the influence of language on literacy acquisition, the incomplete information about true language ability does not allow for any real conclusion about the relationship between language and literacy acquisition. It does, however, speak strongly for the need for future research to definitively ascertain the language skills of

specific ethnic groups, in each site, before going into the class and after completing the class, as well as the language used in daily life. In addition, there is no information about the language spoken and used by the facilitators, and whether facilitators' language and ethnic group matched those of the participants in his/her class, and any future research should determine to what extent facilitators use the local language inside the class to translate Nepali vocabulary to participants. Thus, although a participant's mother tongue seems to have no relationship to literacy acquisition in the multiple regression analysis, the ability of the participant to speak Nepali as a second language or to learn Nepali in the class may be a factor in literacy acquisition, or in performance on the Nepali literacy test.

The second community factor which seems to be related to literacy skill acquisition is the economic condition of the community: classes in villages with higher poverty levels had lower mean literacy scores. This seems to be independent of drop-out rate, since, although poorer villages also had classes with higher drop-out rates, the mean literacy scores emerge from those who did not drop-out. It may be that women, like school girls, experience higher opportunity costs in completing and achieving in literacy classes when the poverty level if higher. In other words, their labor (inside and outside of the house) is more in demand when economic conditions are harsher and the margin for subsistence is smaller. Future research should develop some measure of economic status both for individual participants and for communities to see if this is a determining factor in either participation or literacy skills acquisition.

With regards to community-related factors, literacy skill acquisition and drop-out rate, most community factors (such as remoteness or size of village, crops, resources such

as electricity, water, fodder and fuel) showed no pattern to drop-out rate. However, there may be a connection between the economic condition of the village, such that the higher the poverty level, the higher the drop-out rate. However, since there is no information about the poverty level of specific individuals, this emerges only as a question for further research: Does the economic status of individuals and villages have an effect on drop-out rate? There may also be a connection between caste composition and drop-out rate; although most of the literacy classes had a large proportion of Tamang participants, the class with the most Rai participants (Site 4) had the most drop-outs while the class with the most Magar participants (Site 7) had the lowest drop-out rate. Although it is difficult in situations such as this, where experimental research is impossible to conduct, to get representation of the large number of caste compositions which can occur in classes, future research should endeavor to determine whether caste composition is connected to drop-out rate in a larger number of classes.

Discussion

The first hypothesis under the first primary research question appears to be answered by the fact that those women participated in non-formal education classes that included literacy did gain more literacy skills than women who did not participate. Even dropouts acquire some level of skill compared to the women in the comparison group.

On the basis of the significant differences in literacy acquisition between the PCRW/literacy-only group and the HEAL basic course completers, it initially appears that the second hypothesis is true, that a health/literacy course is a better non-formal education

intervention than literacy alone in helping participants to acquire literacy skills. However, subjects in Group 1 who had attended a previous literacy class did as well as HEAL participants on the literacy test, so one cannot claim that the HEAL integrated health/literacy class is superior to other literacy classes where specific health instruction is not integrated, only that these HEAL classes are superior to the PCRW classes. Since there is no information about the type or quality of the previous literacy classes in which some of the CHV/health-only subjects had participated, it is impossible to make stronger claims about the effectiveness of the HEAL model in imparting literacy skills. Thus, in relation to the hypothesis that the HEAL program helps women acquire more literacy skills than a "literacy only" approach, a null hypothesis must be re-stated: type of non-formal education seems to make no difference in literacy skill acquisition.

The third hypothesis about literacy skill acquisition is accepted: women who completed the post-literacy program did gain more literacy skills than those who participated only in the basic-level non-formal education program. Moreover, one may also state that the HEAL approach appears to be as effective as an average of 4 years of schooling in imparting literacy skills, and there is strong evidence that the additional three-month post-literacy course is effective in helping women acquire advanced literacy skills beyond those acquired in school. It is impossible to say whether it is the quality or design of the HEAL post-literacy course in imparting these stronger literacy skills, or just the additional instruction time that it provides women, as there is no data in this data set to compare literacy performance of post-literacy course completers who participated in a non-HEAL course with the performance of HEAL post-literacy completers.

With regards to the hypotheses about factors that influence and explain possibly differences between groups, these results seem to confirm the importance of hours of instruction as a predictor of literacy achievement, with some characteristic of facilitators that lengthens instruction time or encourages participants to attend for longer. Individual factors such as age, marital status, or distance to class do not emerge as significant predictors of literacy skill acquisition at the basic level, although the Nepali-language speaking ability of the participants may be of importance in determining how well participants acquire literacy skills. Distance to class and radio ownership are positively related to literacy acquisition at the post-literacy level, while distance to road and health post are negatively related to acquisition of skills at the post-literacy level (although these relationships are obtained through a small sample). Economic status of the participants or of the community in which they live may have implications for their ability to attend and achieve in the class.

However, it appears that the most important of the factors for which there is data, in ensuring that women acquire literacy skills in literacy classes, is the amount of time they spend in class. Since hours of instruction is a strong predictor of literacy acquisition, a final analysis was done to see whether non-formal education approach is still a significant factor, controlling for hours of instruction, and whether site within group is also still significant controlling for hours of instruction. Group ($p=.000$) and site ($p=.001$) remain significant factors even controlling for hours of instruction at the basic level; therefore, even though hours of instruction is a significant predictor of a woman's level of literacy skill acquisition, the implementation of non-formal education approach (HEAL vs.

PCRW) under which she learns, as well as the specific class in which she is enrolled, are still significant factors.

The conclusion about the hypotheses that class-related and community-related factors may influence literacy skill acquisition is that hours of instruction, facilitator characteristics, Nepali language speaking ability and economic status of the community are the most important influences on literacy skill acquisition. The strength of the evidence indicates that a strong hypothesis emerging from this exploratory study is that some combination of factors related to the class facilitator may influence acquisition of literacy skills. Factors to investigate in future research include the educational level and gender of the facilitator, his/her activity level and attendance in the class (also related to total hours of instruction), his/her style of teaching and respect for students, and also whether the facilitator is from the same ethnic and language-speaking group as the participants. These factors may be the most important in determining women's persistence and achievement in non-formal literacy classes.

CHAPTER 6

CHANGES IN HEALTH KNOWLEDGE, ATTITUDES AND PRACTICES

Questions and Hypotheses

In this section, we address the primary research questions as they relate to health: to what extent is there a difference in health knowledge acquired between women who participate in the different types of non-formal education or who receive no education, and what are some of the factors that might explain the differences that exist? The specific hypotheses being tested as part of this first question include the following:

- Women who participate in some type of non-formal education will acquire more health knowledge and different attitudes and practices than women who have not participated in non-formal education.
- Women who participate in an integrated health/literacy program will acquire more health knowledge and different attitudes and practices than women who participate in a "health only" program.
- Women who participate in a post-literacy/health program will acquire more health knowledge and different attitudes and practices than women who participate in a basic-level non-formal education program.

This section also investigates the second of the two primary research questions, which aims to identify some of the factors or "influences" that might explain possible differences between groups. The specific hypotheses being tested as part of this second question include the following:

- Individual factors may influence health knowledge acquisition.
- Class-related factors may influence health knowledge acquisition.
- Community-related factors may influence health acquisition.

Methods

To determine the extent of differences between groups in health knowledge acquisition, means testing and ANOVA tests were used. A paired sample t-tests was used to determine if the HEAL post-literacy course helped women acquire significantly more health knowledge than they acquired through completion of the basic HEAL course. Multiple regression was used to identify quantitative individual and class-related factors that may influence health knowledge acquisition. In addition, chi-square analyses were used to identify differences between groups in percentage of subjects with correct knowledge on the various health topic questions. Chi-square was also used to determine the difference between groups in health attitudes and practices. Log linear analysis was used to determine the relationship between correct knowledge, practice, and group membership in subjects' knowledge of and use of family planning methods. Finally, a qualitative analysis was done of the class-related and community-related factors that may explain differences in health knowledge acquisition.

It is in the analysis of community and classroom contextual factors that the limitations of the data set are most obvious. The fact that there is, in effect, no community information about the comparison group sites is a great drawback, since it is impossible to compare the factors across sites to see what made the difference. For example, it is not

known what types of other development projects or efforts may have been going on in the recent past in the comparison group villages, making comparisons with other sites impossible. Also, due to differences in how the enumerators wrote up their field reports, information is missing from other sites about the activity level of the CHV, class facilities, and other possibly important factors for comparing contexts, information that might offer an explanation for differences between participants, by site, in acquisition of health knowledge.

Findings

Non-formal Education Intervention

This analysis tests the hypotheses that women who participate in some type of non-formal education will acquire more health knowledge than women who don't, and that women who participate in the HEAL program will acquire more health knowledge than women who participate in a "health only" program. Significant differences between groups indicate that amount and type of non-formal education approach may play a role in the level of health knowledge acquired. This section also addresses the hypothesis that women participating in a post-literacy/health program will acquire more health knowledge than women who complete only a basic-level program.

As expected, there is a significant difference between comparison group and non-formal education participants in demonstrated knowledge about health. The significance of the differences in health knowledge acquisition by group is p=.000, and by site is

p=.000. Overall, HEAL participants (both at the basic and the post-literacy level) scored highest on the health knowledge interview. Post-hoc tests indicate that the significant differences between groups are between the comparison group and every other group, and that HEAL participants (both after the basic and after the post-literacy course) performed significantly better on the health knowledge interview than the other two non-formal education groups. CHV/health only and literacy only groups were not significantly different from each other in health knowledge. Thus, without controlling for any other variables, it appears that the HEAL approach of combining health education with literacy makes a significant difference in the acquisition of health knowledge, as compared to health education only or literacy education only. However, any type of non-formal education was better than no education at all in affecting health knowledge acquisition. Table 6.1 presents an overview of health knowledge scores for the whole sample, by group (without dropouts):

Table 6.1 Health Knowledge Scores, by Group

Group	Mean Health Score	s.d.	N
1: CHV/Health	14.71	6.29	73
2: Literacy only	13.40	4.74	35
3: HEAL basic	17.85	5.53	60
4: Comparison	8.26	3.37	50
5: HEAL post-literacy	20.53	4.29	38

Participation in the HEAL post-literacy course did not significantly improve health knowledge acquisition over and above participation in the HEAL basic course. A paired sample t-test of 32 subjects in the HEAL group who completed both the basic course and the post-literacy course (and for whom there is both basic and post-literacy interview data) indicates that the HEAL post-literacy course does not add significantly to subjects' health knowledge, over and above the knowledge that is acquired at the basic level. The mean health knowledge score for these women after completing the basic HEAL course is 18.72, compared to a mean score of 21.13 after the post-literacy course. This 2.4 point difference is not significant at the .05 level.

These results demonstrate the extent of the difference in health knowledge acquisition between the HEAL basic approach and literacy-only or health-only approaches, and these results allow for acceptance of the hypothesis that type of non-formal education makes a difference in health knowledge acquisition. Completion of the HEAL post-literacy course does not appear to add significantly to the health knowledge acquired at the HEAL basic level; therefore, the hypothesis that women who complete the HEAL post-literacy program will acquire more health knowledge is not accepted.

Participation Level

This section deals with the first hypothesis in question, that women who participate in non-formal education gain more health knowledge than women who do not participate; specifically, do women gain some health knowledge, as compared to women who never attend such a course, even if they drop out of a literacy or health/literacy course? One

would assume that women would gain some health knowledge from a functional literacy class during the time that they attend the course, and that this knowledge will be greater in an integrated health/literacy class than in a literacy only class. This analysis includes only Groups 2 (literacy only) and Group 3 (HEAL) because information about women's participation in health education in the CHV/health only site is sketchy and doesn't allow for a determination of which women were "dropouts".

Differences between subjects with different levels of participation, by group, were significant at the p=.000 level; specifically, post-hoc tests indicate that all subjects who had exposure to non-formal education, even those who dropped out of the literacy classes, acquired significantly more health knowledge than did the comparison group. However, HEAL dropouts acquired more health knowledge than did literacy-only dropouts, and HEAL completers acquired more health knowledge than literacy-only completers. Therefore, there does seem to be a difference at least between non-formal literacy education approaches. Those subjects in HEAL who would go on to finish the post-literacy course demonstrated greater health knowledge at the end of the six-month course than did other subjects who completed any literacy education course, another indication that women who go on to attend and complete the post-literacy course are those who do better in the first place in the basic literacy course. Table 6.2 presents an overview of the differences in mean health knowledge score, by level of participation:

Table 6.2 Health Knowledge Scores by Participation Level

Participation Level	Health Score	s.d.	N
All drop-outs of basic literacy course	14.33	5.44	27
Group 2 Literacy only	11.71	5.35	14
Group 3 HEAL	17.15	4.06	13
Completed basic course, no post-lit course			
Group 2 Literacy only	14.54	5.00	54
Group 3 HEAL	13.40	4.74	35
	16.32	4.90	19
Completed HEAL course, drop out post-literacy	17.33	6.00	9
Completed HEAL basic and post-literacy*	18.72	5.77	32
CHV/Health only	14.71	6.29	73
Comparison Group	8.26	3.37	50

*This is the health knowledge score, after the six-month course, for those who would go on to complete the post-literacy course.

These findings are important because they indicate that even those who don't complete the non-formal basic literacy course do gain some health knowledge, even with fewer than 100 hours of instruction, so that dropouts overall did not perform significantly different on the health knowledge interview than did subjects who received health education only or subjects who completed the basic literacy course but didn't go on to the post-literacy course. However, HEAL participants, whether they drop out or complete the course, gain more health knowledge than those who participated in another approach to non-formal education.

The Influence of Previous Education

This section relates to the hypothesis about factors that may influence health knowledge acquisition: previous education. If subjects have attended school or a previous literacy class, it may affect how much health knowledge is acquired in non-formal settings, and whether this may partially account for or influence the extent of differences between groups. The variable of previous education could not be added to the multiple regression since the number of subjects with previous schooling or experience in a non-formal literacy class is small. Therefore, it is difficult to answer the question of whether previous education (non-formal literacy education or schooling) is a predictor of the acquisition of health knowledge, so ANOVA was used to determine if it is significant variable.

In this sample (excluding those who dropped out of the literacy classes), only 20 of the 225 subjects had previous schooling (14 of whom were in Group 1 CHV-only, probably because these sites were predominantly Brahmin, and Brahmin/Chhetris castes are traditionally much more likely to send their daughters to school than other castes.) Only 22, all in Group 1 CHV/health-only sites, had previously attended an adult literacy class, and the remainder (176) either had no previous education or there is insufficient information upon which to conclude that they had previous education.

While the analysis of variance shows that, overall, the difference in health knowledge acquisition by previous education was significant ($p=.015$), post-hoc tests indicate that the only significant difference is between subjects with previous schooling

and subjects who had no previous education. Subjects who attended school were not significantly different in health knowledge acquisition from subjects who had previously attended an adult literacy class, and the scores of those who had attended an adult literacy class were not significantly different from those with no education. The effect of previous education on health knowledge can be seen in Table 6.3, for the sample as a whole:

Table 6.3 Mean Health Knowledge Scores by Previous Education Exposure

Previous education	Mean	s.d.	N
With no previous education or no data about previous education	13.32	6.19	176
With previous literacy class + health education	15.41	7.29	22
With previous schooling (all groups)	17.20	4.61	20

A comparison of health knowledge acquisition, by group, of those subjects who had any kind of formal or non-formal educational background (i.e., excluding drop-outs and comparison group participants) indicates that the significant difference is between HEAL subjects (either basic or post-literacy completers) and literacy-only subjects, and only HEAL post-literacy completers scored significantly better than CHV/health only subjects with previous education (either schooling or previous literacy class). CHV/health only subjects with previous education did not score significantly different than literacy-only subjects, and HEAL basic completers were no different than CHV/health only with previous education. These results demonstrate the increase in health knowledge that can

be expected from participation in the HEAL post-literacy course, an increase that gives HEAL post-literacy course completers health knowledge that is significantly better even than subjects in the CHV/health only program who had completed an average of four years of schooling and received health education through the CHV (although that increase still does not make the difference between HEAL basic and HEAL post-literacy significant). The effect of previous education on health knowledge by group is shown in Table 6.4 below:

Table 6.4 Health Knowledge Scores By Educational Experience

Groups	Health Score*	s.d.	N
Group 1: CHV/health ed only	14.71	6.29	73
With no previous ed	12.81	5.74	37
With previous literacy class experience	15.41	7.29	22
With previous schooling	18.64	3.71	14
With either previous lit or schooling	16.67	6.29	36
Group 2: Literacy only (PCRW classes)	13.40	4.74	35
With no previous schooling	12.97	4.69	32
With previous schooling	18.00	2.65	3
Group 3: (HEAL) basic**	17.85	5.53	60
Group 4: Comparison Group	8.26	3.37	50
With no previous schooling	8.17	3.43	47
With previous schooling	9.67	2.08	3
Group 5: (HEAL) post-literacy	20.53	4.29	38
With no previous schooling	21.00	3.98	33
With previous schooling	17.40	5.46	5

*Out of a total possible score of 31.

**All participants with test scores either had no previous schooling or no information is available.

On the basis of this data, then, a hypothesis for further research should be that schooling may provide a foundation on which to build health education, but that foundation is not significantly different than that provided by an adult literacy class in helping women to acquire health knowledge. Existing research indicates that schooling may not be a critical factor if health education is provided. Shoham-Yakubovich, et al, (1991) compared women who went through a health education course in Israel with those who did not, controlling for age and formal education. They reported that "the health education course was effective in reaching mothers of low educational attainment and reduced the importance of formal education and age in determining knowledge of health topics...Mothers with no formal education who took the course scored higher than mothers with over 9 years of education who did not take the course." (p. 149) These findings are important since the literature on the connection between women's education and health behaviors focuses almost exclusively on education through schooling, and the literature promotes the belief that schooling is an essential mechanism for women to understand health issues.

Future research should start with the hypothesis that adult literacy classes for women, like schooling, can also provide a foundation on which health education can build, and that completion of the HEAL post-literacy course is related to acquisition of health knowledge that is superior to schooling plus specific health education.

Individual Factors Related to Health Knowledge Acquisition at the Basic Level

This section tests the hypotheses in the second research question about the importance of individual factors that may influence acquisition of health knowledge. The hypothesis in question is that individual factors may influence health knowledge acquisition.

Multiple regression was used to identify particular individual factors that may influence the acquisition of basic health knowledge. All four non-formal education groups are included in the analysis, looking at the following independent variables to determine their predictive strength on health knowledge score: marital status, caste, age, radio ownership, distance to road, distance to health post, and language. Hours of instruction was not available for the three CHV/health education only sites, and distance to class was not available in five sites, so these variables were not run since missing data meant multiple subjects being excluded from the analysis. Including number of children as a variable also excluded all unmarried subjects, so two separate multiple regressions were run: one for all subjects and one for married subjects only.

The variables that correlate strongly with achievement in health knowledge are marital status, distance to health post, and ownership of radio, such that those subjects who were married, those who lived farther from the health post, and those who owned a radio performed better on the health knowledge interview. Table 6.5 presents a correlation matrix that shows the relationships between each of the variables. Group and

caste are not included in this correlation matrix because there were four and three groups respectively figured into the regression, so there are multiple correlation figures.

Table 6.5 Variables Related to Basic Health Knowledge Acquisition
(N=218)

	PK1	Mar. Status	Age	Radio	Dist. Road	Dist. to HP
PK1	--					
Mar. Status	.22**	--				
Age	.02	.50**	--			
Radio	.22**	-.06	.06	--		
Road	.11	-.02	-.03	-.08	--	
HP	.17**	.03	.02	-.05	.73**	--
Lang	-.03	-.19**	-.14*	-.08	.28**	.09

*Significant at .05 level.
**Significant at .01 level.

Multiple regression of these variables indicates that all the variables together--radio, distance to health post, age, first language, group, marital status, caste, distance to road--account for 43% of the variance among the health knowledge scores. The multiple correlation coefficient is .65 (p=.000) Group membership is the highest predictor of health knowledge acquisition, followed by marital status, age and radio, all significant over and above the other variables. Table 6.6 presents the results of the multiple regression,

with variables in rank order according to their predictive strength for health knowledge acquisition:

Table 6.6 Results of Multiple Regression on Basic Health Knowledge Acquisition (N=218)

Variable	Simple Correlation	Beta Weight	T	Sig T
Group 3 (HEAL)	.39**	.738	9.357	.0000**
Group 1 (CHV/health)	.09	.386	4.394	.0000**
Marital status	.22**	.380	5.884	.0000**
Group 2 (PCRW/literacy only)	-.03	.358	5.003	.0000**
Age	.02	-.180	-2.894	.0042**
Radio ownership	.22**	.158	2.814	.0054**
Distance to health post	.17**	.159	1.841	.0671
Distance to road	.11	-.169	-1.753	.0811
Caste2	-.09	.120	1.510	.1324
Caste	-.01	.028	.311	.7562
Language	-.03	-.040	-.462	.6448

* Significant at .05 level.
**Significant at .01 level.

The mean health knowledge score for married women was 14.61 (n=171) compared to a mean of 11.26 (n=47) for unmarried women. Much of the difference between married and unmarried women can be traced to the HEAL participants: married HEAL participants (those who completed the basic course) scored 20.78 (n=40) compared to a mean of 12.0 for unmarried HEAL completers (n=20). Subjects with

radios had a mean health knowledge score of 15.25 (n=112) compared to a mean of 12.44 (n=106) for subjects without radios. These results indicate that the type of non-formal education one receives is the greatest predictor of health knowledge acquisition, followed by marital status, age, and radio ownership. The other variables are not significant in this model. This produces a hypothesis for further investigation that, among women in general, greater acquisition of health knowledge can be achieved if the subject receives some form of non-formal education (and the order of impact is HEAL, then CHV-only, then literacy-only), is married, is older, and owns a radio.

To test the specific factor that a woman's experience in providing for children's health care may affect her health knowledge acquisition, a second multiple regression was run, including the 171 married subjects only, and adding number of children as an additional independent variable. The significant correlations with health knowledge scores in the analysis of married subjects only are Group 3 (HEAL) (.53, p=.000), radio ownership (.23, p=.001), distance to health post (.15, p.=.02), and distance to road (.13, p=.05). The multiple correlation coefficient is significant at .709 (p=.0000), accounting for 51% of the variance, and it indicates that group membership (non-formal education approach), age, number of children, distance to health post, and radio ownership are significant predictors of health knowledge acquisition. Table 6.7 presents the results of the multiple regression for married subjects:

Table 6.7 Results of Multiple Regression on Basic Health Knowledge Acquisition (Married Subjects Only)
(N=171)

Variable	Simple Correlation	Beta Weight	T	Sig T
Group 3 (HEAL)	.53**	.860	10.21	.0000**
Group (CHV/health)	.01	.440	4.59	.0000**
Age	-.11	-.271	-4.17	.0001**
Group 2 (Literacy only)	-.06	.262	3.48	.0006**
Number of children	.04	.178	2.76	.0064**
Distance to health post	.15*	.177	2.03	.0439*
Radio	.23**	.127	2.14	.0343*
Distance to road	.13*	-.168	-1.69	.0932
Caste2	-.09	.140	1.50	.1346
Caste	-.08	-.004	-.04	.9709
Language	.00	-.116	-1.15	.2435

* Significant at .05 level.
**Significant at .01 level.

Since group (type of non-formal education), age, and radio ownership were consistent significant predictors of health knowledge acquisition whether women were married or not, another series of ANOVA tests was run, controlling for these factors, in order to test the main hypothesis about the extent of differences between groups based on non-formal education approach. Comparing only the three non-formal education groups (no comparison group), and using basic health knowledge as the dependent variable, the analysis indicates that group membership is still a significant variable (p=.000) when controlling for age, marital status and radio ownership.

Overall, type of non-formal education is important in women's acquisition of health knowledge, and the integrated health/literacy approach emerges as the strongest of the three in this study. Participation in non-formal education emerges as the strongest predictor for acquisition of health knowledge, but age and number of children also play an important role, adding strength to a new hypothesis that it may be an underlying factor related perhaps to "motherhood experience" (a combination of age, marital status and number of children) that helps women to acquire health knowledge. The importance of radio as a factor in helping women learn about health issues is underscored by these results as well. Distance to health post is a significant predictor of acquisition of health knowledge for married women only but, interestingly, the direction of the relationship is positive, such that the greater the distance to the health post, the higher the health knowledge acquisition. The qualitative analysis may help to understand why this is so. In any case, the hypothesis that those women who live closer to health post services or to the road will acquire more health knowledge is disproved by this data. The overall hypothesis that individual factors may influence health knowledge acquisition is accepted.

Individual Factors Related to Health Knowledge Acquisition at the Post-Literacy Level

This analysis investigate whether individual characteristics play a role in health knowledge acquisition at the post-literacy level as well. If so, this gives added strength to the importance of these factors. Since type of non-formal education intervention (group), marital status, age, number of children and radio ownership are all important factors in the

acquisition of health knowledge at the basic level, these same factors may or may not be important at the post-literacy level.

For those subjects who participated in and completed the HEAL three-month post-literacy class, and for whom there is data on all variables, the following correlations were found between key variables and health knowledge acquisition at the post-literacy level (PK2). Number of children and caste were not included because cell sizes vary so much that many subjects are excluded. Again, "group" is not a factor since only one group (HEAL) had access to a post-literacy course. Performance on the health knowledge interview after the six-month basic course (PK1) was also included as a variable.

The significant correlations include only age and performance on basic health knowledge interview. Table 6.8 presents the correlation matrix for all the variables among subjects completing the post-literacy course:

Table 6.8 Variables Related to Health Knowledge Acquisition at the Post-literacy Level
(N=33)

	PK2	Mar. Status	Hrs. Inst.	Age	Radio	Dist. Road	Dist. HP	Dist. Class	Lang
PK2	--								
Mar. Status	**.32**	--							
Hins PL	-.10	-.36*	--						
Age	**.34***	**.67****	-.17	--					
Radio	.21	-.28	-.11	.03	--				
Road	-.27	.40*	.21	.30	**-.58****	--			
HP	-.24	.46**	.15	.33*	-.62**	**.96****	--		
Dist Cl	.19	-.38*	-.08	-.31	.22	**-.53****	-.51**	--	
Lang	.10	.27	.41*	.12	-.21	.27	.26	-.27	--
PK1	.34*	.79**	-.07	.59**	-.24	.28	.33*	-.32*	.40*

*Significant at .05 level.
**Significant at .01 level.

Thus, even though factors such as marital status and radio ownership emerged at the basic course level, these same factors do not emerge as significant correlates of health knowledge acquisition at the post-literacy level.

Qualitative Analysis of Class and Community Factors Related to Health Knowledge Acquisition

This section investigates the hypotheses related to the research question of the factors or "influences" that might explain possible differences between groups. Specifically, this analysis tests the hypothesis that class-related and community-related factors in the different sites may influence health knowledge acquisition. While site by itself was a significant variable in health knowledge acquisition, it was not significant as a co-variate ($p=.051$) when compared to group on health knowledge scores. Significant differences between sites were between the two comparison groups and all HEAL groups, between comparison group and the two high-scoring CHV/health only sites, and between two of the HEAL post-literacy sites and the lowest scoring CHV/health only site. There was no significant difference on health knowledge acquisition between the two literacy-only sites and the two comparison group sites. There were no significant differences between the HEAL, the literacy only and CHV/health sites at the basic level. The three HEAL sites received the top three rankings in both health and literacy, but the top ranking was different for health (Site 8 scored highest in health) than for literacy (Site 7 scored highest in literacy). Table 6.9 presents the mean health knowledge scores, by site:

Table 6.9 Mean Health Knowledge Score, by Site

Group and Site	Mean Health Score	s.d.	N	Ranking
CHV/Health				
Site 1	12.04	6.46	27	8
Site 2	16.05	6.05	21	5
Site 3	16.48	5.47	25	4
PCRW/Literacy only				
Site 4	12.79	5.07	14	7
Site 5	13.81	4.59	21	6
HEAL basic				
Site 6	17.11	6.79	19	3
Site 7	18.00	5.12	22	2
Site 8	18.42	4.76	19	1
Comparison				
Site 9	8.48	3.23	25	9
Site 10	8.04	3.55	25	10
HEAL post-literacy				
Site 6	21.54	4.76	11	--
Site 7	20.93	3.06	15	
Site 8	19.08	5.09	12	

These results and rankings raise interesting questions for the qualitative analysis of site-specific information. For example, why did Site One, a CHV/health only site with a supposedly active CHV, rank on par with the literacy only groups, while the other two CHV/health only groups, one of which had a reportedly active CHV and the other a reportedly inactive CHV, rank closer to the HEAL course participants? Why did Site 8, which had fewer hours of instruction than the other HEAL sites, have a higher mean health knowledge score? Since the class supervisor, during his visit, taught the supplementary health lessons during the basic course, this difference in ranking is

interesting because Site 8 was reportedly supervised only twice and Site 7 ten times; thus, the highest-ranking health score site received, in theory, only two supplementary health lessons while the second ranking site received ten supervisory visits. These questions will be explored in the sections on the influence of classroom and community contextual factors, below.

Influence of Class-related Factors on Health Knowledge Acquisition

Unfortunately, much of the information about the non-formal education context is not comparable between health education and literacy education interventions. For example, in the groups where literacy classes were held, there is comparable information (albeit incomplete) on the location of the class, the class facilities, and the time of the class. However, similar information does not exist in the data set about the Mothers' Group meetings where the health education took place. However, even with the information available, there seems to be no consistent pattern of influence between any classroom factors and health knowledge acquisition. Even facilitator factors (such as level of education and possibly gender) that may be influential in relation to literacy scores did not show a pattern related to health knowledge outcomes. Although one would think it likely, the activity level of the CHV was also not consistently associated with higher health knowledge, since one of the CHV/health only sites that was identified as having a "non-active" CHV scored better than another CHV/health only site where the CHV was classified as being very active. However, all of the top four ranking sites (the three HEAL sites and one CHV/health only site) in health knowledge scores had CHVs who were

considered active, so perhaps this is a critical factor deserving of more detailed data collection in future research. Presence of an active CHV may be the most plausible explanation for why Site 8, with fewer supplementary health lessons, performed better: it may be that it is not the specific health lessons offered in the HEAL basic course that lead to increases in health knowledge over and above health only or literacy only, but that it is the literacy intervention in combination with an active CHV in the site that leads to greater health knowledge acquisition. If the CHV in that site had been very active in providing health education prior to the onset of the literacy class, the interaction of the literacy instruction with the continuing influence of the CHV may have helped promote health knowledge acquisition for those participants.

Influence of Community-related Factors on Health Knowledge Acquisition

For some factors, such as number of latrines, house construction, development, and schooling of kids, the information is too sketchy overall to make any conclusions about the presence or absence of patterns. Similar to the results above, there were no community contextual factors that showed a relationship to health knowledge acquisition. Gender of the interviewer also did not show a relationship to how well subjects did on the health knowledge interview, whether it was given by a male, by a female, or by a male with a female assistant. Economic status of the community, which did seem to affect literacy participation and achievement, did not seem to be related to differences in health knowledge acquisition. Nor does there seem to be any explanation for why living farther from the health post, in particular, would be associated with greater health knowledge

acquisition. This again draws attention to the flaws in the data collection and in the study design. Better ethnographic information about the communities would help in developing hypotheses for the quantitative factors that seem to be associated with health knowledge acquisition.

Analysis of Individual Health Knowledge Content Areas

In addition to showing overall differences in health knowledge scores based on non-formal education approach, this data set also allows for an analysis of the differences in specific health knowledge content areas. Using chi-square tests to determine if the percentage of subjects with correct awareness of the different topics on the health knowlege interview (immunization, AIDS, oral rehydration, family planning, dog bite, water sanitation, smoking during pregnancy, birth spacing) are significantly different between groups, helps to determine the extent to which non-formal education approach influences health knowledge acquisition in specific content areas. Subjects were classified as having "correct knowledge" in a particular area if they received a certain number of points out of the total possible points in that area. Further explanation will be provided under the description of each content area below.

For these analyses, five groups are compared: Group 1=subjects in sites 1-3 who received health education only through the CHV, Group 2=subjects in sites 4-5 who completed the basic "literacy-only" course, Group 3=subjects in sites 6-8 who completed the basic six-month HEAL (health/literacy) course, Group 4=comparison group

participants in sites 9-10 who received no non-formal education, and Group 5=subjects in sites 6-8 who completed the three-month post-literacy HEAL course. This "fifth" group was included in order to determine the extent to which participation and completion in the specific HEAL post-literacy course affected knowledge related to health.

In general, a higher percentage of participants who received specific health education (CHV/health only or HEAL at either level) demonstrated correct knowledge about AIDS, intestinal worms, and family planning. HEAL participants demonstrated a higher percentage of correct knowlege in areas of smoking during pregnancy, water sanitation, and dog bites. In some content areas, subjects who were married were separated out, to see how marital status affected knowledge in areas such as birth control, immunization, birth spacing and oral rehydration that are traditionally "off limits" to unmarried women. In Table 6.10, a summary is presented of the percentage of subjects in each group who demonstrated correct knowledge in the different health knowledge content areas:

Table 6.10 Summary of Correct Knowledge in Health Content Areas, By Group

Content Area	Group 1: CHV only (N=73) % w correct	Group 2: Literacy only (N=35) % w correct	Group 3: HEAL Basic (N=60) % w correct	Group 4: Comparison (N=50) % w correct	Group 5: HEAL Post-literacy (N=33) % w correct
Smoking during pregnancy	1.4	5.7	16.7	2.0	21.2
AIDS	23.3	11.4	18.3	2.0	51.5
Immuni-zation	58.9 all 59.0 marr	34.3 all 42.0 marr	51.7 all 72.0 marr	8.0 all 7.0 marr	60.6 all 64.0 marr
Water Sanitation	7.0	3.0	36.0	2.0	51.5
Oral rehydration	53.4	57.1	91.7	34.0	93.9
Worms	41.1	2.9	28.3	2.0	87.9
Family Planning	71.2 all 70.4 marr	17.1 all 19.0 marr	58.3 all 77.5 marr	0 all 0 marr	66.7 all 81.0 marr
Dog Bites	1.4	2.9	23.3	0	21.2
Birth Spacing	13.6 all 14.1 marr	45.7 all 47.6 marr	55.0 all 62.5 marr	2.0 all 2.6 marr	63.6 all 61.9 marr

All=all subjects in the group
Mar=Married subjects only in the group

Knowledge About Smoking During Pregnancy

Subjects were asked to say what would happen if a woman smoked during pregnancy; the correct response was that the child in the womb might be small in size when born. "Correct knowledge of smoking" was stringently marked to determine when subjects had specific correct knowledge that smoking during pregnancy affected the baby

in the womb, not just that it was bad for the mother's health or that the newborn baby could get sick. If a subject could say that the baby would get "sick", she was given one point; if the subject could say that the baby inside the womb would get sick or that the baby would be underweight, she received two points; "correct knowledge" was classified if the subject received 2 points. The purpose of this was to determine just how many subjects were aware of the specific connection between smoking during pregnancy and low-birth weight infants. Thus, even many women who expressed the attitude that smoking was not an activity in which pregnant women should engage did not indicate that they knew the exact reason why such smoking was bad during pregnancy in particular.

In this sample, 91.6% of all subjects did not have correct knowledge of the consequences of smoking during pregnancy, meaning that they weren't able to say that the developing fetus or newborn baby would be affected or underweight. The difference between all groups was significant at .00047, but strongest results between any two groups were mainly between HEAL (either basic or post-literacy) and CHV-only. This is one of the few areas where CHV-only education did not improve health knowledge compared to literacy only or even no education at all: there was no significant difference ($p=.15$) between CHV-only, literacy only and comparison groups in this topic area. Additional instruction during the HEAL post-literacy course did not significantly increase the percentage of correct health knowledge in this area, beyond what was gained in the HEAL basic course. Table 6.11 presents the results related to knowledge about dangers of smoking during pregnancy:

Table 6.11 Differences Between Groups in Correct Knowledge of Smoking During Pregnancy

Groups: % Correct Knowledge		1 CHV-only	2 Literacy only	3 HEAL basic	4 Comparison
1 CHV only:	1%	--			
2 Literacy only:	6%	N.S.	--		
3 HEAL basic:	17%	**	N.S.	--	
4 Comparison:	2%	N.S.	N.S.	*	--
5 HEAL post:	21%	**	N.S.	N.S.	**

N.S. = Not significant
* p=<.05
**p=<.01

Knowledge About AIDS

Subjects were asked the question: "How would someone get the disease AIDS?" The HEAL post-literacy materials have a specific lesson on AIDS, with a comic featuring a Nepali woman tricked into going to Bombay who then became a prostitute. This lesson provides facts about the specific ways that one can contract AIDS (from blood, multiple sexual partners without protection, infected needles). The health knowledge question was designed to determine how many women really understood the way AIDS is transmitted, rather than what types of behavior are risky. Therefore, answering "being a prostitute", although such behavior would put one in a high risk group, does not convey a knowledge of how AIDS is transmitted, and thus was not marked as correct. In future research on health knowledge about AIDS, more accurate information could be gleaned by asking two separate questions, one designed to determine if women understand what behaviors put one at risk and another question designed to determine if women understand exactly how

AIDS is transmitted. Technically speaking, it is through sharing needles or having unprotected sex with someone who is HIV-positive or with someone who has AIDS that the HIV virus and AIDS is transmitted, but AIDS education in Nepal generally uses the term "AIDS" to refer both to HIV-positive and AIDS; the differentiation between HIV and AIDS is not presented clearly in most materials.

· A total of two correct points was given for one or more correct answers, including: from blood, using an unclean needle used by someone who has AIDS, multiple sexual partners, unprotected sex with someone who has AIDS. Points were not given for answers such as: getting an injection, prostitution, being in contact with a foreigner or someone who has come from Bombay, or sharing personal objects (towels, dishes) with someone who has AIDS. A subject was marked as having "correct knowledge" of AIDS if she had even one correct answer, since knowledge about AIDS is so new in Nepal.

In this sample (excluding drop-outs), 80.1% of the 251 respondents from all groups did not have correct knowledge of AIDS (meaning that they could not name even one way that AIDS was transmitted). At the basic literacy level, groups which had some exposure to health education (CHV-only and HEAL) had a greater percentage of subjects with correct knowledge of AIDS. However, the percentage of women who demonstrated correct knowledge about AIDS rises to 51.5% after the post-literacy course (in which a specific lesson about AIDS was presented.) The chi-square test indicates that the difference between all five groups is significant at p=.000. Table 6.12 presents the differences between individual groups in correct knowledge about AIDS:

Table 6.12 Differences Between Groups in Correct Knowledge of AIDS

Groups: % Correct Knowledge	1 CHV-only	2 Literacy only	3 HEAL basic	4 Comparison
1 CHV only: 23%	--			
2 Literacy only: 11%	N.S.	--		
3 HEAL basic: 18%	N.S.	N.S.	--	
4 Comparison: 2%	*	N.S.	**	--
5 HEAL post: 51%	**	**	**	**

N.S. = Not significant
* p=<.05
**p=<.01

Thus, having exposure to some type of health education increases the likelihood of knowing how AIDS is transmitted, especially so if one has completed the HEAL post-literacy health course. There was no significant difference between types of basic non-formal education, but participating in literacy alone was not significantly different from having no education at all.

Knowledge About Immunization

Subjects were asked four questions about immunization. The questions, along with the correct answers, are as follows:

1. *How many immunizations do you have to give a child?* The health education literature states that the BCG shot for TB should be given one time only sometime after birth. The first DPT shot is to be given 15 days after birth, then every other month for a total of three times. Polio shots are given at the same times as DPT.

For measles, the child should receive one shot sometime between 9 months and 1 year old. Thus, the answer to this question can be quite complex, depending on whether the TB shot is received at the same time as another shot. Therefore, an answer of 4, 5 or 6 times was counted as correct. Less than 4 or more than 6 was counted as incorrect.

2. *At what age do you start the first immunization?* "At 15 days", "just after birth", or "within the first month" were all counted as correct answers.

3. *At what month intervals do you have to give subsequent shots?* "Every other month" or "every two months" was counted as the correct answer.

4. *By what month should the last immunization be given?* Any answer between "9 months" and "1 year" was counted as correct.

5. *Why do you immunize your child?* "To protect from disease" or "to keep from getting a disease" was counted as correct. "Curing disease" was not counted as correct.

6. *By giving immunizations, which diseases can you protect your children from?* There are four possible correct answers to this question, including: TB, Tetanus/whooping cough/diphtheria, polio, or measles.

There were nine possible points in all about immunization. "Correct knowledge about immunization" was satisfied if a respondent received 7 or more points out of a total nine. While this may seem stringent, it was done to ensure that a categorization of "correct knowledge" means that the respondent really has sufficient knowledge about immunization. Also, since almost every participant in most groups knew that the reason

to immunize a child was to protect it from getting diseases, a cut-off point of 7 points for "correct knowledge" categorization ensures that the respondent received enough points on other questions to count as well versed in the number, type and timing of immunization shots.

Overall, almost every subject was able to say that immunizations protect children from diseases, demonstrating that there is widespread understanding of the purpose of immunization. Beyond that, however, specific instruction in health education proved beneficial in helping women to understand when and what types of immunizations should be given to children. Two sets of chi-square analyses were done: one comparing correct knowledge by group among all subjects (except dropouts from the literacy class) and one comparing correct knowledge by group among married participants only. This "married only" subset analysis was performed because immunization, like family planning and birth spacing, is related to children, and a separate analysis helps to shed light on the possible influence of motherhood.

Among the whole sample, 56.2% of all subjects demonstrated correct knowledge about immunization, which, considering the strictness of classification as "correct", demonstrates the strides that have been made on this topic in Nepal. The difference between the five groups on the chi-square test was significant at the .000 level. Table 6.13 presents the results of knowledge about proper immunization:

Table 6.13 Differences Between Groups in Correct Knowledge of Immunizations

Groups: % Correct Knowledge		1 CHV-only	2 Literacy only	3 HEAL basic	4 Comparison
1 CHV only:	59%	--			
2 Literacy only:	34%	*	--		
3 HEAL basic:	52%	N.S.	N.S.	--	
4 Comparison:	8%	**	**	**	--
5 HEAL post:	60%	N.S.	*	N.S.	**

N.S. = Not significant
* p=<.05
**p=<.01

Except between any non-formally educated group and the comparison group, where the differences are greater, the differences, where they exist, are slim, such that although there is no difference between CHV-only and HEAL basic, and no difference between literacy only and HEAL basic, there is a difference between CHV-only and literacy only. Participating in the HEAL post-literacy program does not significantly increase participants' correct knowledge over and above either learning from the CHV only or attending the HEAL basic literacy course. In this area, unlike other health education areas, CHV/health only education does not have significantly less of an effect on participants' health knowledge compared with participation in the HEAL basic or post-literacy course. This is probably due to the fact that immunization is one of the three main areas where CHVs provide health education to women in the village.

For married subjects only, correct immunization knowledge in some groups rises among those who are married; marital status seems to make the largest difference among

HEAL basic participants, where correct knowledge jumps from 51.7% for all subjects to 72% of married subjects, and among literacy-only participants, where correct knowledge jumps from 34.3% to 42%. These groups have more unmarried women. It makes almost no difference in CHV/health only and comparison groups, probably since a greater majority of the women in these groups is married. Table 6.14 presents the differences between groups in correct knowledge of immunizations, among only married subjects:

Table 6.14 Differences Between Groups in Correct Knowledge of Immunizations (Married Subjects Only)
(N=158)

Groups: % Correct Knowledge		1 CHV-only	2 Literacy only	3 HEAL basic	4 Comparison
1 CHV only:	59%	--			
2 Literacy only:	42%	N.S.	--		
3 HEAL basic:	72%	N.S.	N.S.	--	
4 Comparison:	7%	**	**	**	--
5 HEAL post:	64%	N.S.	N.S.	N.S.	**

N.S. = Not significant
* p=<.05
**p=<.01

These data indicate that, for both unmarried and married women, non-formal education of any type is better than no education in helping women acquire correct knowledge about immunizations. Differences between non-formal education approaches disappear among subjects who are married, but remain significantly different from comparison group subjects' knowledge. These results may indicate that married subjects are more receptive to information about immunization, or that unmarried subjects are

more reticent to give answers indicating that they know about a topic that is related to motherhood and child care.

Knowledge About Water Sanitation

Subjects were asked two questions about water sanitation: "what makes water dirty?" and "how can you make dirty water clean and drinkable?" In many places in Nepal, there are no taps that provide access to clean well water. Water is gotten, oftentimes after a long walk, from rivers, ponds, or natural springs that bubble from the side of a hillside and into which a bamboo pipe has been rudimentarily stuck to channel the water, or by diverting water from a creek or spring source higher up the hill through plastic pipe. Every village has a different configuration of water access. Since relatively few people have latrines, and it is not uncommon for all activities that require water (such as bathing, washing clothes, and cooling off the water buffalo) to happen right in or near the source, water sources can easily become contaminated. This question was asked to determine if women had an understanding of the types of activities in and around the water source that can make water unsafe to drink, and once it is dirty, how it can be cleaned and made potable.

Five points were possible for these two questions about water sanitation. Three points were possible for the first question, "What makes water dirty?" Correct answers included "urinating or defecating near the source", "washing clothes or dishes in the source", or "children or buffalo swimming in the source". Some subjects gave answers such as "Leaves falling in the source" which was not marked as correct since this would

not be likely to make the water unsafe to drink, even though it looks dirty to the eye. Two points were possible for the question "How can dirty water be made clean and drinkable?" Correct answers included "boil", "filter", or "use chlorine or water purification pills" (information about such pills is not generally presented in non-formal education materials since such pills cost money and are not readily available in villages, yet a few subjects did mention them so such an answer, since it's technically correct, was marked correctly). Any of these answers scored a point, up to two points. Some subjects gave answers such as "build a tap"; while this would certainly help to establish a clean water source, it does not answer the question of how dirty water can be made clean, so it was not given a point. A subject received a coding of "correct knowledge of water sanitation" if they got three out of five answers correct. Again, this is a rather stringent criterion for "correct knowledge", but the purpose of such stringency is to really determine the extent of differences between groups in understanding the factors that can make water dirty. This is especially important for women to understand if they are going to be using oral rehydration therapy for children with diarrhea: oral rehydration solution prepared with dirty water will not, in the long-term, solve the child's problem. In addition, the basic literacy course materials, the health/literacy materials, and the health education materials used by CHVs do present information about the types of factors which may contaminate water and how contaminated water can be cleaned through boiling and filtering. In particular, the HEAL post-literacy materials present an entire lesson on water contamination and purification, so we can determine whether such focused instruction affects an understanding of water sanitation.

In general, relatively few subjects had "correct knowledge" (3 out of 5 questions correct) about water sanitation: only 18.3% of subjects in the five groups demonstrated correct knowledge. In this content area, HEAL participants clearly acquired more knowledge. The chi-square test indicates that the difference between all five groups is significant at p=.000. Table 6.15 presents the significant differences between groups in this content area:

Table 6.15 Differences Between Groups in Correct Knowledge of Water Sanitation

Groups: % Correct Knowledge		1 CHV-only	2 Literacy only	3 HEAL basic	4 Comparison
1 CHV only:	7%	--			
2 Literacy only:	3%	N.S.	--		
3 HEAL basic:	36%	**	**	--	
4 Comparison:	2%	N.S.	N.S.	**	--
5 HEAL post:	52%	**	**	N.S.	**

N.S. = Not significant
* p=<.05
**p=<.01

In this topic area, having participated in the HEAL course made a significant difference to knowledge about water sanitation. In this case, the HEAL post-literacy course did not add significantly to participant's understanding of water sanitation, over and above participation in HEAL basic, even though there was specific content related to water sanitation in the post-literacy course. Neither of the two other non-formal education approaches (CHV/health only or literacy only) were significantly different from each other or from having no education at all.

Knowledge About Oral Rehydration Therapy (ORT)

Information about Jeevan Jal (the name of the packaged oral rehydration solution in Nepal) has been disseminated widely over the past five years. It is one of the three main areas (along with immunization and family planning) about which female Community Health Volunteers are trained to provide information and education. It is particularly important for mothers to know about oral rehydration solution, since the incidence of death in children from diarreoheal diseases is still high, largely due to the lack of clean water and the lack of knowledge about giving water to the child when she or he has diarrhea, and such deaths can be easily prevented. While children are often the ones in the family with the greatest need for ORT, the treatment is applicable to family members of any age who get diarrhea. Thus, the Ministry of Health and numerous international donors (AID, UNICEF, etc.) have done a great deal to support the dissemination of information about the availability and correct use of ORT. Such information appears in the basic and HEAL literacy courses, as well as in the CHV training. The Ministry of Health also maintains that Jeevan Jal packets are widely available across the country. Although this may be the case in some areas, it is difficult to believe that a ready supply can be found in many of the more remote areas. Thus, information about Jeevan Jal as ORT was also, in the past, accompanied by information about how to make homemade oral rehydration solution (mix salt and sugar together in water). The name for this solution ("noon-chini paani", literally salt/sugar water) is also widely known in many areas, although health education materials nowadays are discouraged from listing instructions for homemade ORS as an option, since the Ministry maintains that Jeevan Jal,

the commercially-produced packet considered superior to the homemade solution, is available everywhere.

In this area, the health knowledge interview was designed to discover if subjects knew what Jeevan Jal was for, how it was made, how long it should be administered, and what the homemade alternative to Jeevan Jal was. Subjects were asked the following six questions; the answers accepted as correct and the number of points given are also included for each answer:

1. "*What is Jeevan Jal for*?": diarrhea (or any like answer), 1 point
2. "*How do you make Jeevan Jal*?": Mix the whole packet in six glasses of water until completely dissolved, 3 points. This question, unlike most of the other questions in the health knowledge interview, also came a with "yes/no" response option, in the form of the following three subquestions:
    a. "*Mix the whole packet*?"
    b. "*Put one packet in six glasses of water*?"
    c. "*Should the whole packet be completely dissolved*?"

    If the subject could answer the question readily as an open-ended question, with all of the three pieces of information correct (whole packet, six glasses of water, completely dissolved), she was given three points. If she couldn't answer right away, she was asked each of the three sub-questions in turn, to which she could answer "yes", "no", or "I don't know". One point was given for each "yes" answer.

3. "*If you cannot find Jeevan Jal in your village, what else can you feed somebody who has diarrhea*?": salt/sugar water, 1 point.

4. "*For how long should you give Jeevan Jal solution to a sick child*?": until the diarrhea has gone, 1 point.

"Correct knowledge" about oral rehydration therapy was coded if the subject answered 5 out of the 6 questions correctly. Again, this may seem a stringent coding system, but information about oral rehydration therapy is so widespread that a high cut-off point for correct knowledge means ensuring a true picture of the number of subjects who have enough knowledge to successfully use ORT.

Correct knowledge about ORT is indeed fairly high, relative to the other content areas. A full 65.5% of all subjects in the sample demonstrated correct knowledge about ORT (5 out of 6 answers correct). Only a very few people did not know that Jeevan Jal was for treating diarrhea, and most knew that a homemade alternative to Jeevan Jal was salt/sugar water. However, the differences in scores came mostly from a correct understanding (or lack of understanding) about how Jeevan Jal was made and used. Again, participation in the HEAL basic or post-literacy course helped a greater number of subjects acquire correct knowledge of ORT. The differences between all groups on the chi-square test was significant at p=.000. Table 6.16 presents information about the differences between groups in correct knowledge on ORT:

Table 6.16 Differences Between Groups in Correct Knowledge of Oral Rehydration Therapy

Groups: % Correct Knowledge		1 CHV-only	2 Literacy only	3 HEAL basic	4 Comparison
1 CHV only:	53%	--			
2 Literacy only:	57%	N.S.	--		
3 HEAL basic:	92%	**	**	--	
4 Comparison:	34%	N.S.	N.S.	**	--
5 HEAL post:	94%	**	**	N.S.	**

N.S. = Not significant
* p=<.05
**p=<.01

Participation in the HEAL post-literacy course did not make a significant difference in correct knowledge of ORT, above and beyond what was gained in the HEAL six-month basic course. Interestingly, the literacy-only subjects scored higher than the CHV/health-only subjects, even though this is one of the three main health education areas for CHV subjects, but this difference was not significant. This may be due to the inclusion in the basic literacy materials (Naya Goreto books) of information about how to make ORT. Thus, the significantly better scores in this area of the HEAL basic participants (who also use the NAIA Goreto books but with supplementary health lessons) may be attributed to these supplementary HEAL health lessons, the first of which contains information and a demonstration of how to prepare oral rehydration solution, or it may be attributed to the reinforcement from the literacy materials of what HEAL participants have learned outside of class from their CHV about oral rehydration therapy. Still, it is heartening to see that a full third of the comparison group participants, who had no

specific exposure to non-formal education, were able to demonstrate correct knowledge of ORT, perhaps due to radio public service announcements or to the work of health service staff in that area. No significant difference between comparison and CHV/health only or comparison and literacy only was found.

Knowledge About Intestinal Worms

On this subject, only one question was asked of participants: "How do children get worms in their stomachs?" Many subjects gave the response, a traditional Nepali belief, that worms come from eating too many sweets. If a subject responded that worms in the stomach come from dirty food, dirty water, or dirty hands (not washing hands before eating), they received one point; if they responded that worms come from eating too many sweets, they received no points. Even if a subject indicated multiple correct answers, she still received only 1 point total. A very few subjects responded that flies sitting on the food before eaten could make it dirty, and that of course was also marked correct. "Correct knowledge" was coded if the subject received one point in this area. (An additional question, "what do worms do in your stomach?", was discarded from analysis because almost every subject gave the response "stomach hurts", which provided no additional information to the analysis.)

On this topic, 31.1% of all subjects in the 5 groups demonstrated a correct understanding that worms are caused by ingesting dirty food or water or via dirty hands. In this content area, any type of health education increased health knowledge. The difference between groups on the chi-square test is significant at p=.000. The high

incidence of HEAL post-literacy subjects answering correctly on this question may be due to the specific lesson that is included in the HEAL post-literacy book that deals specifically with worms and their causes. Table 6.17 presents an overview of group differences in this content area:

Table 6.17 Differences Between Groups in Correct Knowledge of Intestinal Worms

Groups: % Correct Knowledge		1 CHV-only	2 Literacy only	3 HEAL basic	4 Comparison
1 CHV only:	41%	--			
2 Literacy only:	3%	**	--		
3 HEAL basic:	28%	N.S.	**	--	
4 Comparison:	2%	**	N.S.	**	--
5 HEAL post:	89%	**	**	**	**

N.S. = Not significant
* p=<.05
**p=<.01

Therefore, basic health education of any type (CHV-only or HEAL basic) makes a significant difference in acquiring correct knowledge about worms, whereas literacy-only education does not, but the HEAL post-literacy course adds significantly to subjects' knowledge in this topic area, over and above the basic HEAL or CHV-lead education.

Knowledge About Family Planning

Subjects were asked to name two family planning methods; a point (up to two points total) was given for each birth comparison method cited. Subjects were marked as

having "correct knowledge" about family planning if they were able to name two specific methods (condoms, male or female sterilization/vasectomy or laparoscopy, pills, IUD, Norplant, Depo Provera, or vaginal spermicide capsule). An answer of "permanent" or "temporary" did not count as correct, although this does represent some knowledge of family planning; the reason for this stringency is to better ascertain how non-formal education approaches might influence specific and more exact knowledge of family planning options, since many married women in Nepal have at least heard that there are temporary and permanent ways to control births but often have no more specific knowledge than that about types of family planning.

Among all subjects for whom there is interview data, correct family planning was demonstrated by 41% of women. Exposure to some type of health education made a significant difference in this content area. Not one of the 50 comparison group women either could (or would) state two specific types of family planning method. While this may be due, to an unknown extent, to shyness in talking with the enumerator, three of these women weren't too shy to tell the enumerator, when asked if they used any family planning method, that they had laparoscopy surgery, yet they did not mention this method as a type of family planning. The difference between all groups on the chi-square test was significant at p=.000. Table 6.18 presents the results of tests on differences between groups in family planning knowledge:

Table 6.18 Differences Between Groups in Correct Knowledge of Family Planning Methods

Groups: % Correct Knowledge		1 CHV-only	2 Literacy only	3 HEAL basic	4 Comparison
1 CHV only:	71%	--			
2 Literacy only:	17%	**.	--		
3 HEAL basic:	58%	N.S.	**	--	
4 Comparison:	0%	**	**	**	--
5 HEAL post:	67%	N.S.	**	N.S.	**

N.S. = Not significant
* p=<.05
**p=<.01

The impact of CHV/health-only education was probably strong in this topic area because it is one of the three areas in which CHVs are specifically trained to provide education. However, the difference between CHV/health-only, HEAL basic and HEAL post-literacy subjects was not significant. Nor was correct knowledge after the HEAL post-literacy course significantly different than knowledge after the HEAL basic literacy course. Although participation in some type of health education imparted more knowledge than participation in literacy only, exposure to the literacy-only course did make a significant difference compared to no education at all.

Family planning is another topic area where it is useful to see if being married makes a difference in one's acquisition of knowledge. Among married women only, 53.1% of subjects had correct knowledge of family planning. The percentage of correct knowledge among married women increased in the HEAL basic and HEAL post-literacy groups, but it did not change much within CHV/health-only and literacy-only groups.

Among married HEAL basic subjects, 77.5% demonstrated correct knowledge (compared to only 58.3% among all HEAL basic subjects), and 81% of married HEAL post-literacy course completers (compared to 66.7% of all HEAL post-literacy subjects) demonstrated correct knowledge. The differences between groups in family planning knowledge do not change from analysis to analysis. Family planning, then, is different than immunization in this respect, where differences between non-formal education approaches that appear when all subjects are included disappear when only married subjects are analyzed. For example, the percentage of participants with correct knowledge goes up in the HEAL group when unmarried women are excluded from the analysis. However, although there are a comparable percentage of unmarried women in the literacy-only group, the percentage of participants with correct knowledge of family planning does not rise in that group. Therefore, it is possible that specific health education, as opposed to literacy only, is necessary to make a significant difference in correct knowledge of family planning among married subjects, whereas the experience of being married (and, through that, having children) helps women acquire knowledge about immunization, over and above what is learned through the literacy class. Table 6.19 presents the differences between groups in correct knowledge of family planning, among only married subjects:

Table 6.19 Differences Between Groups in Correct Knowledge of Family Planning (Married Subjects Only)
(N=158)

Groups: % Correct Know		1 CHV-only	2 Literacy only	3 HEAL basic	4 Comparison
1 CHV only:	70%	--			
2 Literacy only:	19%	**	--		
3 HEAL basic:	78%	N.S.	**	--	
4 Comparison:	0%	**	**	**	--
5 HEAL post:	81%	N.S.	**	N.S.	**

N.S. = Not significant
* p=<.05
**p=<.01

Thus, participation in any type of non-formal education program seems to make a significant difference to women's acquisition of family planning knowledge, but participation in some type of specific health education (whether coupled with literacy or not) is the best vehicle for conveying information about family planning.

Knowledge About First Aid For Dog Bites

This question was designed to ascertain subjects' understanding of first aid. Two points were possible, with "correct knowledge" being classified if subject received two points. The question was "What should you do to treat a dog bite?" The correct answers were, ideally, wash the wound with soap and water, bandage the wound, and take the person to the health post. Many subjects answered simply "go to the hospital" or "get an injection". Since these answers do not show any understanding of the need to immediately wash and clean the wound or to get to treatment as fast as possible, and since injections

may not always be needed, they were not marked as correct. However, if the subject said "wash the wound and then go to the health post", or "or bandage the wound and go to the health post", two points were given; if the subject said "take the person to the health post", they received one point (not enough to qualify as having "correct knowledge" in this area but the point did add to their overall health knowledge score).

In this subject area, HEAL participants showed a better understanding of how to use first aid to immediately treat a dog bite. The differences between all five groups on the chi-square test were significant at .000. Table 6.20 presents the differences between individual groups in correct knowledge of first aid:

Table 6.20 Differences Between Groups in Correct Knowledge of First Aid for Dog Bites

Groups: % Correct Know		1 CHV-only	2 Literacy only	3 HEAL basic	4 Comparison
1 CHV only:	1%	--			
2 Literacy only:	3%	N.S.	--		
3 HEAL basic:	23%	**	**	--	
4 Comparison:	0%	N.S.	N.S.	**	--
5 HEAL post:	21%	**	*	N.S.	**

N.S. = Not significant
* p=<.05
**p=<.01

The difference between CHV-only, literacy only and comparison was not significant, nor was the difference between HEAL basic and HEAL post-literacy, even though first aid treatment for dog bite is a lesson taught in the HEAL post-literacy

curriculum. The conclusion is that participation in the HEAL project (whether at the basic or post-literacy level) makes it more likely that participants will have correct knowledge about this topic.

Knowledge About Birth Spacing

Subjects were asked two questions about birth spacing: "What is the best number of years to wait between the birth of children?" and "If you do have children before the minimum number of years, who is affected and how?" The first question is scored quantitatively as an attitude question, and the results are presented in the section below about specific health attitudes. The second question is analyzed here as a knowledge question, aimed at determining if women know why spacing their children's births too closely together is detrimental to both mothers' and children's health. Two points were given for correct knowledge of the detrimental effects of close birth spacing; in order to receive two points, the subject needed to indicate that both mother and child were affected (not just the mother or the child only), and how specifically they would be affected (could get sick or weak). Subjects were given one point if they said that both mother and child were affected but didn't state an effect, or one point if they only cited either mother or child as being affected but did state a specific effect. A subject was categorized as having "correct knowledge" if she received two points, that is, if she knew that both mother and child would be more likely to get sick or be weak if births were spaced too closely together.

Overall, 27.9% of subjects had correct knowledge of birth spacing. In this content area, it appears that non-formal education that includes the literacy component makes a significant difference to acquisition of knowledge about birth spacing. The difference between all groups on the chi-square test is significant at p=.000, but there was no significant difference between literacy only, HEAL basic and HEAL post-literacy in this area. Table 6.21 presents the differences between individual groups in correct knowledge of birth spacing:

Table 6.21 Differences Between Groups in Correct Knowledge of Birth Spacing

Groups: % Correct Knowledge		1 CHV-only	2 Literacy only	3 HEAL basic	4 Comparison
1 CHV only:	14%	--			
2 Literacy only:	46%	**	--		
3 HEAL basic:	55%	**	N.S.	--	
4 Comparison:	2%	*	**	**	--
5 HEAL post:	64%	**	N.S.	N.S.	**

N.S. = Not significant
* p=<.05
**p=<.01

Thus, any type of non-formal education makes a difference in acquisition of knowledge about the effects of close birth spacing, but CHV/health-only education is the least effective of all the non-formal education approaches in this content area.

Among married participants, the difference between groups is still p=.000. The percentage of women in each group changes only slightly (less than 2 percentage points) in each of the groups, with the exception of the HEAL basic participants; 62.5% of

married participants vs. 55% of all HEAL basic participants demonstrate correct knowledge about birth spacing. Interestingly, the significant difference (p=.02) between all comparison group subjects and CHV/health-only subjects disappears when only the married subjects from each of these groups are compared, even though the percentage of married women with correct birth spacing knowledge is marginally higher in both groups. These results demonstrate the low acquisition of knowledge among CHV/health-only educated women in this topic area. Table 6.22 presents the differences between individual groups in correct knowledge of birth spacing, among only married subjects:

Table 6.22 Differences Between Groups in Correct Knowledge of Birth Spacing (Married Subjects Only)
(N=158)

Groups: % Correct Knowledge		1 CHV-only	2 Literacy only	3 HEAL basic	4 Comparison
1 CHV only:	14%	--			
2 Literacy only:	48%	**	--		
3 HEAL basic:	63%	**	N.S.	--	
4 Comparison:	3%	N.S.	**	**	--
5 HEAL post:	62%	**	N.S.	N.S.	**

N.S. = Not significant
* p=<.05
**p=<.01

While marriage (and its association to having children) contributes to the chances that women will have correct knowledge of birth spacing, it is literacy education, either with or without specific health education, that is associated with the acquisition of knowledge about birth spacing.

Analysis of Specific Health Attitudes

These analyses test the first three hypotheses under the first primary research question: that women who participate in non-formal education will acquire different attitudes and practices than women who do not participate in non-formal education; that women who participate in an integrated health/literacy program will different attitudes and practices than women participate in a "health only" program; and that women who complete a post-literacy/health program will acquire different attitudes and practices than women who complete only a basic-level non-formal education program. In order to determine the extent of differences between groups on specific attitudes (birth spacing, ideal number of children, smoking during pregnancy, building latrines, and utilizing health services), cross-tabs and chi-square analyses were conducted. The same five groups (CHV/health-only, literacy-only, HEAL basic, comparison, and HEAL post-literacy) were included in these analyses.

Attitudes Towards Birth Spacing

Subjects were asked the question: "What is the best number of years to have between the birth of children?" This was treated as an attitude question, since it tries to determine women's opinion of the best spacing of births. Subjects either answered "I don't know" (and were given a score of "0") or cited a number of years (1, 2, 3, 4, etc.) Some subjects cited two figures, such as "3 or 4 years"; since it is difficult to analyze

differences between groups when two answers are involved, a decision was made always to take the lower of the two numbers.

The mean for best number of years between births for all subjects (n=218) after the basic education phase is 3.43; the mean for all married subjects (n=171) is 3.47. Comparison group subjects were much more unified than other groups in their responses: 86% of comparison group subjects stated that either three or four years was the best space of time between births. Only 24 out of 218 subjects said they didn't know how many years was best (and thus received a score of "0"). The CHV/health-only group had a number of subjects (23%) who either didn't know or said "2 years", while the HEAL post-literacy group had 69.6% who said either "4 years" or "5 years" and only one subject who didn't know. The results are analyzed quantitatively using one-way ANOVA, by group; the means by group were not significantly different (p=.61), and there were no differences between any two of the four groups. There was, however, a significant difference (p=.05) between married subjects in the CHV/health-only and the HEAL post-literacy groups, such that married HEAL post-literacy participants expressed a preference for a longer period of time between births. Table 6.23 presents the means for each group, representing the average number of years thought best to space children's births:

Table 6.23 Mean Number of Years for Birth Spacing, by Group

Group	All Subjects			Married subjects		
	Mean	s.d.	N	Mean	s.d.	N
CHV-only	3.23	1.49	73	3.25	1.51	71
Literacy only	3.60	2.04	35	3.71	2.10	21
HEAL basic	3.53	1.81	60	3.70	1.59	40
Comparison Group	3.48	.97	50	3.49	.88	39
HEAL post-literacy	3.75	1.68	32	4.05	1.43	20

These results indicate that there is an attitudinal preference for spacing births about three years apart in Nepal, regardless of participation in non-formal education, non-formal education approach, or marital status. However, the attitudes of those married participants who complete the HEAL post-literacy course are significantly different, in favor of lengthening the time between births, from those married subjects who received CHV/health-only education.

Attitudes Towards Ideal Number of Children.

Much family planning education in Nepal, whether through literacy education courses, by radio, or through CHVs, has focused on promoting "small families, happy families" that include no more than two children. The benefits of reducing the total number of children--more resources to feed, clothe and educate children--have been depicted throughout the Naya Goreto and HEAL literacy materials. However, attitudes towards the number of children one should have are possibly influenced by religion.

Hinduism is a religion where one's predetermined fate or "karma" is influenced by the gods, and many people believe that the number of children one has is "up to God". Therefore, even if a woman believed that a smaller number of children in the family might be better, she still may believe that it is not in her control, and that the ideal number is the number God has ordained. In addition to the ideal total number of children, there has traditionally been a heavy preference for sons, based on the patrilineal nature of Nepal culture (Stash, 1996). Since daughters move to other villages to live with their husbands, and sons stay with their parents, many Nepalis prefer to have sons who can provide support over the long-term and can be counted on to take care of the parents in their old age; they also bring their brides into the family, who serve as a major source of household labor. Since daughters also traditionally do not inherit the assets of their parents, the birth of a son is valued so that the family's assets may continue to be passed down in the family's name. Finally, tradition calls for the son to light the parent's funeral pyre. All of these beliefs and traditions contribute to a strong desire for sons.

Since reduction of the overall birth rate is a major goal of the Nepali government, it is important to see if non-formal education affects women's attitudes towards the ideal number of children one should have, and to see if exposure to non-formal education changes women's attitudes towards preference for boys. Subjects were asked to say how many children they thought it would be ideal for a woman to have, as well as how many boys and how many girls should make up that ideal number. All subjects who gave answers to this question are included in this analysis.

Overall, the mean for ideal number of children for the sample as a whole was 2.6, with almost 55% of the women indicating that the ideal number is two children. The ideal number of daughters was 1.2, with 80% desiring only one daughter; and the ideal number of sons was 1.5, with 56% desiring only one son. The comparison group had the highest mean number of children desired. The results for these questions, by group, are shown in Table 6.24 below:

Table 6.24 Ideal Number of Children, Means by Group

Group	Ideal Number of Children			Ideal Number of Sons			Ideal Number of Daughters		
	Mean	s.d.	N	Mean	s.d.	N	Mean	s.d.	N
CHV-only	2.32	.58	72	1.25	.44	72	1.07	.31	72
Literacy only	2.34	.68	35	1.29	.46	34	1.21	.77	34
HEAL basic	2.42	.72	59	1.34	.48	56	1.11	.41	56
Comparison	3.56	.78	46	2.09	.41	46	1.48	.55	46
HEAL post-literacy	2.50	.76	29	1.34	.48	29	1.21	.41	29

Using ANOVA, the difference between the basic groups (excluding HEAL post-literacy) is significant at .000 level, but post-hoc analysis (Scheffe) indicates that the difference is only significant between the comparison group and each of the other groups; differences between non-formal education groups are not significant.

The number of children subjects actually had was a significant co-variate to the total ideal number of children that subjects thought a woman should have, such that the

more children one had, the more children one thought was ideal. The number of children a woman actually had was a significant co-variate to the number of sons women wanted but not significant to the ideal number of daughters. In other words, women generally wanted one daughter no matter how many children they had, but if they had more children the ideal number of sons increased. Caste was not a significant co-variate to the ideal number of children; the question of whether religion affects desired number of children is still unknown. These results indicate that any type of non-formal education seems to have a positive affect on reducing the ideal number of children desired, but that boys are still preferred to girls.

Attitudes Towards Smoking During Pregnancy

In order to ascertain women's opinion of whether or not one should smoke cigarettes[1] while pregnant, subjects were asked to answer the question: "Should women smoke while they are pregnant?" (This was followed by a question asking what the effect of smoking would be on mother or child, the results of which were analyzed above as a knowledge question.)

83.3% of the subjects across the five groups (CHV-only, literacy only, HEAL basic, comparison and HEAL post-literacy) say women shouldn't smoke during pregnancy. 16% say they don't know whether they should or not, and only 3% say that it's appropriate for pregnant women to smoke. 56% of the comparison group women

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1 Usually, these are not real cigarettes but "bidis", small hand-rolled inexpensive cigarettes which are more commonly found in rural areas.

thought it was OK or didn't know, compared to only 5% of the 60 HEAL respondents, and 15.1% of the CHV-only respondents; 100% of the women in both the literacy only and the HEAL post-literacy groups say it is not good for women to smoke during pregnancy. The difference between groups is significant at p=.000, but since several of the cells in the cross-tabulation are zero, a complete analysis of the difference between any two groups is impossible. It appears, though, as if the main difference is between the comparison group and the non-formal education groups, with the CHV/health-only group having slightly more women who either don't know or think it is alright to smoke than the groups where literacy is part of the instruction; however, the difference between CHV-only group and HEAL basic group is not significant, and the other differences cannot be calculated since 0% of literacy-only and HEAL post-literacy women said that it was OK. These results signify that most women believe that smoking during pregnancy should be avoided, and this attitude is more prevalent among women who have had some form of non-formal education.

Attitudes Towards Building Latrines

After asking subjects whether or not they had a latrine to use, they were asked "If you do not have a latrine, why haven't you built one?" Here the analysis includes those who did not have or use a latrine, in order to find out why they had not built one. Answers fell into the following categories: "it's our habit" (either to go outside or not to use a latrine), "it's easier this way", "don't know why", "no time", "not necessary", "no space", (some participants live in rented houses or on rented land and so might not be

permitted to build structures on landowners land), "lots of open space" (so why confine onself to a latrine?), and "I intend to but just haven't done it yet". In general, among those women who did not use latrines, they generally gave reasons that had more to do with a lack of understanding about why it was important to use a latrine than reasons that had to do with logistical reasons such as lack of space or money. In the HEAL basic group, 31.7% of all the women in the group said that it was "easier this way" (to go outside), and 48% of all comparison group women said they either didn't know why or it was not necessary to build a latrine. Although 58% of HEAL post-literacy subjects do say they use a latrine, 23.7% said that it was their "habit" to go outside.

The main purpose in analyzing the reasons for not building or using latrines is to discover whether there was some intent to build a latrine, thereby demonstrating an understanding of its benefits, or no intent to build. Reasons given by subjects about why they hadn't built a latrine were therefore regrouped into these two categories, with "no money", "no time", "no space", or "intend to but.." being categorized as "some intent to build" (since these reasons indicate a willingness but some logistical reasons such as lack of resources that serve as an obstacle). Reasons such as "habit", "easier this way", "don't know why", "not necessary" or "lots of space" were categorized as "no intent to build". 79.3% of those who did not use latrines gave reasons that demonstrated "no intent" to build. The differences between groups in percentage of subjects indicating "some intent to build" is significant (p=.02), as shown in Table 6.25:

Table 6.25 Differences Between Groups in Attitudes Towards Building Latrines (Among Subjects Who Did Not Use Latrines)

Groups: % Indicating Intent to Build	1 CHV-only	2 Literacy only	3 HEAL basic	4 Comparison
1 CHV only: 29%	--			
2 Literacy only: 67%	N.S.	--		
3 HEAL basic: 16%	N.S.	**	--	
4 Comparison: 30%	N.S.	N.S.	**	--
5 HEAL post: 17%	N.S.	N.S.	N.S.	N.S.

N.S. = Not significant
* p=<.05
**p=<.01

From the enumerators' reports on Sites 4 and 5, it seems clear that the Production Credit for Rural Women (PCRW) project and the local women's development group has had a positive influence on Group 2 women's desire to have and build latrines. What is puzzling is the very low use of latrines and intent to build latrines among HEAL participants, given the higher percentage of women in the HEAL group who have correct knowledge about water sanitation; HEAL basic participants showed significantly less intent to build than did comparison group subjects, and even after the post-literacy class, HEAL completers were not significantly different from comparison group women in their intent to build latrines. Clearly, the knowledge of how water becomes dirty and the results of drinking dirty water (intestinal worms) have not given HEAL participants even an intent to build a latrine. Further studies should investigate this gap between knowledge increase and intent to practice.

Attitudes Towards Health Services

The data set also provides information about when women feel they should use the services of the health post and hospital. This data comes in the form of answers to two questions:

1. "*In what situation do you have to take your child to the health post?*"
2. "*In what situation do you have to take your child to the hospital?*"

The data was coded according to the most common answers given to both: "common sickness" (specific nature of illness not mentioned), "child is very sick", "hurt in accident", "specific symptoms named" (diarrhea, fever, vomiting), "if not better at first place of treatment", "child loses appetite", or "don't know". In general, women see the health post as a place to go when children have common illnesses (40% of total) and the hospital as a place to go when children are very sick (45% of the total). They do view the hospital as a place to go after the health post or other resources (such as consulting the dhami-jhankri) have not been able to help. The chi-square difference between groups is significant at p=.000. Those who have had some literacy instruction (Groups 2, 3 and 5) more often than the other groups state specific symptoms or "hurt in accident" as the reason to go to the health post. The responses for women in each group and for the whole sample are presented in Table 6.26 below.

Table 6.26 Reasons for Using Health Services, Percentages by Group

Reasons	Group 1: CHV (n=73)	Group 2: Literacy (n=35)	Group 3: HEAL basic (n=60)	Group 4: Comparison (n=50)	Totals (n=218)
Go to Health Post					
Common sickness	59 %	34 %	13 %	50 %	40 %
Very sick	3	0	17	0	6
Hurt in accident	0	3	3	4	2
Specific illness	0	51	33	6	19
Not better at first	3	0	32	24	15
Don't know	33	3	0	2	12
Loses Appetite	0	9	0	14	5
Go to Hospital					
Very sick	43 %	54 %	35 %	52 %	45 %
Common sickness	0	23	0	22	9
Not better at HP	32	6	60	4	29
Don't know	25	6	2	12	12
Hurt in accident	0	3	2	10	3
Specific illness	0	9	0	0	1

Several other trends within these responses are interesting. First, a higher percentage of literacy-only and comparison group subjects tend to state that they go to the hospital for common sicknesses, whereas more women in the CHV/health only and HEAL groups go to the hospital after the child has been unsuccessfully treated at the health post. More HEAL basic and comparison group women state that they go to the health post when the child does not improve after the first treatment, perhaps related to a greater use of the local dhami/jhankri. About a third of CHV/health only subjects state that they don't know under which situations to go to the health post or hospital.

Analysis of Specific Health Practices

This final set of analyses tests the same hypotheses in the section on attitudes above. The specific health practices being compared here include use of family planning methods, use of latrines, and seeking advice in case of illness. Chi-square is used to determine significant differences between non-formal education groups in adoption of health behaviors.

Family Planning Practices

Only the responses of married women are analyzed in this content area, since unmarried women always answered "none" or just "I'm not married" in response to the question "What type of family planning have you used?" It would be extremely rare (and never told to an interviewer) if an unmarried girl in Nepal were to use birth control. There are several limitations to this data. The first is that some of the enumerators were male, so it is logical to assume that, in a context such as Nepal, at least some of the participants may not have answered truthfully, saying "none" when in fact they were using some form of birth control. Therefore, we might assume that the percentage of women actually using family planning methods may be higher than is represented in this data, across all groups. Second, it is reasonable to assume that some percentage of married women, especially younger women, who replied that they were not using any form of birth control are in fact not doing so because they are trying to get pregnant for very good reasons: they are ready to have their first child at a reasonable age or they are ready to have their second child

several years after the first was born. In other words, not using birth control should not automatically be assumed to represent "poor" reproductive behavior. At issue here is simply whether there are differences between groups in use of birth control, which would imply that family planning practice may be influenced by non-formal education approaches.

Overall, 74.1% of the married women (n=158) in the basic sample claim that they are not using birth control. The comparison group had significantly fewer women who claimed they used birth control. The overall difference is significant at the .007 level. There was no difference between the four groups who had some non-formal education. The difference between literacy only and comparison was, however, not significant, whereas the three non-formal education approaches that included some health component were significantly different from the comparison group in usage of birth control. Table 6.27 presents the differences in family planning practice among married subjects only, by group:

Table 6.27 Differences Between Groups in Family Planning Practice (Married Subjects Only)
(N=158)

Groups		1 CHV-only	2 Literacy only	3 HEAL basic	4 Comparison
1 CHV only:	28%	--			
2 Literacy only:	25%	N.S.	--		
3 HEAL basic:	42%	N.S.	N.S.	--	
4 Comparison:	8%	*	N.S.	**	--
5 HEAL post:	32%	N.S.	N.S.	N.S.	*

N.S. = Not significant
* p=<.05
**p=<.01

Among the women who did say they used family planning methods, the difference in types of birth control reveals that literacy only and comparison groups had more women with a preference for permanent types of family planning (laparoscopy or vasectomy), whereas HEAL participants (either basic or post-literacy) who used birth control demonstrated a preference for temporary birth control options, especially Depo Provera and pills. CHV/health-only subjects also showed a preference for permanent birth control, but more women from this group had husbands who had had vasectomies. Among those women who stated that they use birth control and gave the type, the type of birth control used, by group, is presented in Table 6.28 below:

Table 6.28 Types of Family Planning Methods Used, By Group (Married Women Only)

Group	Condom	Laparoscopy	Oral Contraceptive Pills	Depo Provera	Other (usually vasectomy)
CHV-only (n=17)	3	4	0	0	10
Literacy only (n=5)	1	4	0	0	0
HEAL basic (n=16)	1	1	4	10	0
Comparison (n=3)	0	3	0	0	0
HEAL post-lit (n=5)	0	0	2	3	0

There are several potential reason for the differences, however, so it is difficult to attribute family practice preference to non-formal education on the basis of these results. First, the mean age of the CHV/health only group is older, so that may account for more use of permanent family planning: the average age for women in the CHV/health only groups whose husbands had vasectomies is 36.6, and the average age of the women in CHV/health only and comparison groups who had laparoscopic surgery was 33, whereas the average age of the HEAL Depo users is 30 and those who use pills is 29. The number of children (which is usually related to age) is also a factor: those whose husbands had vasectomies had an average of 4 children, and those who had laparascopy had 3.8 children, vs. an average of 2.4 children for condom users, 2.9 children for Depo users, and 3.5 for pill users. There is no information about the family planning services

available in the study areas; it is possible that the health service personnel in some areas promote Depo more than in other areas, or that permanent family planning methods are more easily obtained in other areas. However, it is also possible that HEAL women, through the health/literacy class and with the aid of the CHV, are more exposed to the different options available for birth control. Future research should gather information about the family planning services promoted and available in these areas. Ideally, the research design should gauge family planning practice before and after the non-formal education intervention.

Latrine Use Practice

Subjects were asked if they had any place, other than outside, to urinate and defecate. Subjects answered either "latrine", or they answered "outside", "by the river", "in the fields", "near the pit by the spring", etc. In this sample, almost exactly half of the participants use a latrine and half don't: 53.6% of subjects stated that they had a latrine. The differences between groups indicates that latrine use was much higher among CHV/health-only and literacy-only than among the other groups. The differences between groups on the chi-square test are significantly different (p=.000); data on the differences between each of the groups is presented in Table 6.29 below:

Table 6.29 Differences Between Groups in Latrine Use

Groups		1 CHV-only	2 Literacy only	3 HEAL basic	4 Comparison
1 CHV only:	90%	--			
2 Literacy only:	91%	N.S.	--		
3 HEAL basic:	22%	**	**	--	
4 Comparison:	8%	**	**	N.S.	--
5 HEAL post:	58%	**	**	**	**

N.S. = Not significant
* p=<.05
**p=<.01

HEAL basic and comparison group sites show significantly lower use of latrines than the other sites. Participation in the HEAL post-literacy course seems to make a significant difference in use compared to the HEAL basic and comparison groups, but it is still significantly lower than CHV/health-only groups and literacy only. In addition to the possibility that CHV/health-only and literacy-only non-formal education approaches have a greater effect on latrine use than does the HEAL approach, there are two other factors that may influence latrine use. One factor is culture or perhaps income; since CHV/health-only sites are predominantly Brahmin, there may either be some preference within that caste group for using latrines or else a greater ability to bear the cost of building a latrine. The other factor may be attributable to a specific emphasis on latrine building; mention is made in the researcher's notes that the Production Credit for Rural Women project (which ran the literacy-only courses) had made a great "push" towards building latrines in the areas in which it worked, which included sites 4 and 5 in the literacy-only group area. The large jump in latrine use among HEAL post-literacy completers (the majority of

whom were in the HEAL basic course) may mean either that the HEAL course does influence latrine use but that it takes some time after the basic course for this to occur, or it may simply mean that HEAL participants became aware that saying they use a latrine is a more acceptable answer to the question.

Practice of Seeking Advice in Case of Illness

One of the stated goals of both the Community Health Volunteer program and the HEAL program was to increase women's use of the local CHV as a resource for advice about health problems. The Ministry of Health wants to increase the efficiency of the primary health care system at the village level, since there is not a long-standing belief in using health services for treatment of medical problems. Chalker, et al (1990) conducted research with rural Nepali villagers to determine their beliefs about the causes of illnesses and the course of treatment sought. Sickness was divided into two categories: "emerging from the body", caused by bad food, poor working conditions, dirt, poverty, cold, etc., or "caused by a god or spirit". Symptoms such as dizziness and headache were often attributed to angry gods or spirits. Chalker found that the pattern of treatment was the following: first, no treatment is given but the sick person allowed to get better on his/her own. Second, if the person does not improve, home herbal remedies are used. Third, if home remedies do not work, the faith healer ("dhami") is called. Finally, if there is still no improvement, the health post will be visited. There was also a belief that when the cause of the illness was an angry god or spirit, the health post treatment would make it worse; therefore, it is important to see the "dhami" first, unless the problem is a cut or injury from

an accident (in which case it is appropriate to visit the health post right away). Another reason villagers are reluctant to visit the health post is that health post staff are often perceived as "rude" to villagers, or as discriminating against poorer villagers by giving them the "bad drugs" and saving the "good drugs" for sale. These beliefs and perceptions may account for why 15% of the subjects say that they visit the health post only after the person does not get better from "first treatment" (probably treatment by the dhami-jhankri).

The health knowledge interview used in this study attempted to discover where women sought health advice, and to see whether exposure to a Community Health Volunteer or to a literacy program increased the likelihood that women would seek help for medical problems from the health services. Women were asked a series of four questions:

1. "*When a child is sick, who's the first person you seek advice from*?"
2. "*If a child is very sick, where do you go first*?"
3. "*If his/her advice doesn't work, where do you take the child next time*?"
4. "*After that, where do you take the child*?"

While there may have been a better way to phrase these questions, they do provide some indication of where women feel they go to seek advice about medical matters. In general, the coding categories were set up according to the most common answers for all the questions, and these answers included: "husband" (used by married women), "father/mother/other relative" (used by unmarried women), "Community Health

Volunteer", "Dhami Jhankri" (the local medicine man who uses traditional spiritual healing practices), "health post", "hospital", "pharmacy", "treat at home", "Village Health Worker", or "don't know". Unmarried women were encouraged to answer the questions as if they did have children, but in some cases (particularly in those groups such as the literacy-only group where women overall were younger) there is a higher percentage of "don't know" responses. However, not all unmarried or childless women answered that they didn't know, so the questions did not fail entirely with this subset of subjects.

The chi-square differences between the first four groups (CHV/health only, literacy only, HEAL basic, and comparison) is significant at p=.000 for all four questions. 80% of women first seek advice about medical matters from within the household, either from the husband or from a father/mother or other relative. Then, they tend to go to the dhami jhankri, and if that is not successful, to a hospital or health post nearby and finally either to a local or a big city hospital for treatment. The services of the CHV are sought only by CHV/health only or HEAL participants, and then only as the first choice or second choice; according to these respondents, CHVs are not sought as alternatives for serious medical care. Village Health Workers are not generally thought of as an option for advice. Table 6.30 presents the percentage of women overall and in each group seeking advice from the various sources and services available. Only the most common answers under each question are included in the table, in an effort to present the overall picture of major differences between groups, and the totals are for groups 1-4 only, so as not to duplicate the subjects in Group 5 whose were also counted in Group 3.

Table 6.30 Percentage of Women Seeking Medical Advice from Different Sources, By Group

Sources of Advice	Group 1: CHV (n=73)	Group 2: Literacy (n=35)	Group 3: HEAL Basic (n=60)	Group 4: Compar-ison (n=50)	Totals (n=218)	Group 5: HEAL Post-Lit (n=38)
First Advice						
Husband	51 %	46 %	33 %	66 %	49 %	11 %
Father/mother	15	14	23	24	19	11
CHV	11	0	8	0	6	26
Dhami Jhankri	0	0	25	0	7	32
Health Post	11	0	7	0	6	5
Don't Know	3	40	0	2	8	8
Treat at home	3	0	0	8	3	3
Advice when Very sick						
Dhami Jhankri	8	71	42	80	44	13
Health Post	34	29	30	18	28	61
Hospital	49	0	10	0	19	21
CHV	0	0	17	0	5	0
Don't Know	3	0	0	2	1	5
Pharmacy	3	0	2	0	1	0
Alternative next time						
Hospital	60	29	42	26	42	68
Health Post	0	69	48	72	41	5
Don't Know	12	0	2	2	5	11
Pharmacy	14	3	0	0	5	3
Dhami Jhankri	7	0	3	0	3	0
Treat at home	4	0	2	0	2	0
Next Alternative						
Hospital	33	71	73	52	55	16
Big city	38	26	18	38	31	29
Dhami Jhankri	6	0	0	0	2	0
Health Post	0	3	5	0	2	3
Don't Know	1	0	3	2	2	26
Treat at home	21	0	0	0	7	11

In the CHV/health only group, women seek the advice of husband or relative, CHV, or health post first. When children are sicker, then seek care from the health post or hospital. The final alternative is either a local or big city hospital, or to treat back at home. Women in the CHV/health only group tend to seek hospital care sooner, rather than going to a jhankri when the child is sick, and they tend to think that bringing a child back home is a final alternative more than do women in other groups.

The path of advice-seeking for women in the literacy-only group seems to be husband/household first, then dhami/jhankri in cases of serious illness, then health post and finally "local" hospital, which is 2-4 hours away as opposed to a big city hospital that can take up to 2 days to reach.

Women completing the HEAL basic course seem to demonstrate a more varied course of action during children's illnesses. While they also show a preference for checking with husband or household, they also will confer with either the CHV or dhami/jhankri as a starting point. In cases of more serious illness, the group is split between going to the dhami/jhankri, the health post, the CHV or the hospital. When these are not successful, their next alternative is either the health post or hospital, and the final alternative choice is the local hospital.

Comparison group women show a preference for first seeking advice from husband or family members, but in cases of more serious illness the majority prefer the services of a dhami/jhankri. As another alternative, they will choose the health post and finally the local or big city hospital.

Women who complete the HEAL post-literacy course seem to follow a pattern similar to the CHV/health only group women, rather than the HEAL basic completers. Post-literacy course completers seem to seek out either the dhami/jhankri or the CHV first, with less reliance on family for advice. In cases of serious illness they go to the health post, representing a decrease in use of the dhami/jhankri from basic HEAL participants. Their next alternative is to go the hospital, and their final alternative is to go to a big city hospital. More post-literacy completers also say that they "don't know" where to go as a final alternative, or that they would treat the child at home.

On the basis of these results, it would seem that literacy only and comparison group subjects, and, to a certain extent, HEAL basic subjects more often seek out the help of a dhami/jhankri for cases of serious illness, which is in line with the findings of Chalker, et al, about the course of treatment rural villagers follow in cases of illness. However, CHV/health only subjects rely on dhami/jhankris much less and on the health service system more, and HEAL post-literacy completers show similar tendencies of beginning to rely more on CHVs and the health post. One explanation might be that the literacy only and HEAL participants, and to a lesser extent the comparison group, simply live farther away from the health post. However, the difference in responses between HEAL basic and HEAL post-literacy groups (where the same women are represented in both) casts doubt on this explanation. The HEAL post-literacy course actually has a lesson in which a dhami and a CHV work together to treat a child with diarrhea, showing that their advice need not be mutually exclusive. It may be either the messages about the health service system or the information about the causes of sicknesses (poor sanitation, lack of

immunizations) received through the CHVs' education in Group 1 and the post-literacy/health course received by Groups 3 and 5 that account for their greater use of health services. In any case, these results present a hypothesis for future research: exposure to longer-term health education (either through CHV mothers' group meetings or through a health/literacy program that involves the CHV) changes women's attitudes about the course of treatment they seek in cases of illness, such that they begin to rely more on CHVs, health posts and hospitals for treatment.

Analysis of Relationship Between Health Knowledge and Practice

Loglinear analysis was conducted to see if there is a relationship between subjects' knowledge and their practice in family planning and if group membership (non-formal education approach) is a factor in that relationship. This analysis was conducted only with married subjects. It does include those who had been sterilized, since sterilization is a form of birth control. Loglinear analysis was conducted to show the relationship between three variables: correct knowledge of family planning, use of family planning, and non-formal education approach.

As mentioned above, and not surprisingly, those subjects who received specific health education as part of their non-formal educational experience showed the greatest percentage of correct knowledge about family planning: approximately 3/4 of CHV-only basic HEAL participants, and HEAL post-literacy participants demonstrated correct knowledge of family planning methods, compared to only 1/5 of literacy-only participants;

no comparison group subjects were able to name two methods of family planning. The majority of married subjects in each of the groups claimed that they did not use birth control. Table 6.31 shows the percentages of subjects (among married subjects only) in each of the groups that demonstrated correct knowledge of family planning, the percentage of those who say they use family planning, and the percentage of those with correct knowledge who use family planning; the comparison group is not included here because 0% of the subjects in the comparison group demonstrated correct knowledge of family planning:

Table 6.31 Percentage of Subjects with Correct Knowledge of Family Planning Who Use Family Planning, By Group

Group	% with Correct Knowledge of Family Planning	% Who Claim to Use Family Planning	% of Total Group With Correct Knowledge Who Use Family Planning
CHV/only (n=61)	77%	28%	25%
Literacy only (n=20)	20%	25%	15%
HEAL Basic (n=38)	76%	42%	40%
HEAL Post-Literacy (n=19)	74%	32%	26%

The loglinear analysis of the relationship between group, correct knowledge of family planning, and use of family planning is not significant. Participants who received

any type of health education demonstrated roughly equal correct knowledge of family planning, and HEAL basic participants demonstrated the highest usage of family planning methods, but this difference is not significant. Therefore, we would hypothesize that there is not a significant relationship between knowledge of family planning and use of family planning that is influenced by type or amount of non-formal education.

Discussion

Overall, health knowledge scores are higher for the HEAL course participants, even controlling for site. HEAL basic course participants performed better than CHV/health only or literacy only participants but completion of the HEAL post-literacy course did not add significantly to health knowledge acquisition above and beyond the basic HEAL course. HEAL post-literacy completers demonstrated significantly more health knowledge than subjects with schooling plus health education. Any type of non-formal education, however, was better than no non-formal education at all. Type of non-formal education was the most significant predictor of health knowledge acquisition, followed by marital status, age, and radio ownership. Among married women, number of children was also a significant predictor. Thus, two of the hypotheses connected with the first research question are accepted: that women who participate in non-formal education acquire more health knowledge than those who don't participate, and that women who participate in an integrated health/literacy program acquire more health knowledge than those who participate in another type of non-formal education program. However, the third hypothesis is not accepted for health knowledge; women who participated in the

post-literacy/health program did not necessarily acquire more health knowledge than women completing the basic literacy/health program.

In the specific health content areas, subjects overall demonstrated the strongest health knowledge in the areas of oral rehydration, immunization and family planning. Health education alone is not significantly better than HEAL in any topic, and health education alone is only significantly better than literacy alone in the topic areas of immunization, worms and family planning. Women in the CHV/health-only group demonstrate good acquisition of health knowledge in the areas of family planning, immunization, and oral rehydration; literacy-only women in birth spacing and immunization; and HEAL basic participants in oral rehydration, birth spacing, family planning and immunization. Comparison group women demonstrated very low correct knowledge in all areas except in oral rehydration, where 1/3 had correct knowledge. The HEAL post-literacy completer group demonstrated the highest percentage of correct knowledge across the majority of subjects. In no content area did the CHV/health only group or the literacy only group have a significantly higher percentage of correct knowledge than in the HEAL basic or HEAL post-literacy groups. The integrated health-literacy approach (HEAL), whether at the basic or post-literacy level, is related to significantly more health knowledge than other non-formal education approaches or the comparison group in the areas of smoking during pregnancy, water sanitation, oral rehydration and dog bites; in these areas, CHV/health only and literacy only performed no different than the comparison group. The only area where literacy-only participants showed greater correct knowledge than CHV/health only participants was in birth spacing.

Overall, literacy-only participants showed no significant difference from the comparison group in percentage of women with correct knowledge except in the areas of family planning, birth spacing and immunization. It is only in the content areas of AIDS and intestinal worms where participation in the HEAL post-literacy course leads to higher correct percentages than participation in the HEAL basic course; in these two areas, CHV/health only and HEAL basic participants, while scoring higher than literacy only and comparison women, were not significantly different from each other. This is most likely due to the specific lessons in the post-literacy book that deal with AIDS and intestinal worms. Marital status (and its association to having children) equalized the correct knowledge about immunization so that there was no significant difference between non-formal education groups; in the area of family planning, marital status did not change the differences between groups, where those with health education (CHV/health only or HEAL) demonstrated more knowledge than literacy only or comparison.

The conclusions about health attitudes and practices are more complicated. Subjects overall believe at least three years is best between children's births, and there remains a preference for sons, regardless of non-formal education. However, any type of education was related to a preference for fewer children. Most women know that smoking is bad, but significantly more women in the comparison group than in other groups expressed the belief that it is alright for pregnant women to smoke. HEAL participants showed a decided lack of intent to build latrines, even less than comparison group subjects and much less than literacy-only subjects. Most subjects express the attitude that the health post is for common illnesses and the hospital is for serious illness,

but comparison group subjects more often would go to the hospital rather than the health post in cases of common illness. Overall, participation in any type of non-formal education was related to attitudes different than the comparison group subjects' attitudes towards health, but there was not much difference in attitudes by type of non-formal education. The same pattern is observed in relation to health practices. Participation in any type of non-formal education was associated with higher usage of birth control than no education, but incidence of use was not associated with one type of non-formal education over another, and 3/4 of all participants claimed they did not use any type of birth control. HEAL participants more often used temporary forms of birth control, whereas comparison, CHV/health-only and literacy-only subjects more often used permanent birth control. While over half of the subjects used a latrine, the rate of latrine use was highest among CHV/health only and literacy only; completion of the HEAL post-literacy course was positively related to latrine use, while completion of the HEAL basic course made no difference in latrine use compared to that of the comparison group. In case of illness, most women seek advice first in the household, then with the dhami-jhankri, then at the health post, and finally at the hospital, but health education through a CHV or through HEAL was associated with seeking the advice of the CHV, either as a first or second option. Thus, no strong conclusions can be made about changes in attitudes and practices in relation to type of non-formal education; however, it is clear that education of any kind is associated with more positive attitudes and practices in health.

These results lead to a conclusion that the HEAL project is an effective mechanism for transmitting health knowledge. The only factor that emerged from the qualitative

analysis that might explain differences between groups in health knowledge acquisition was the activity level of the CHV, but this alone does not seem sufficient to account for the significant differences; one low-scoring CHV/health only site also has a purportedly active CHV. No truly legitimate reasons can be stated for why an active CHV might make a difference, since the data set does not present an agreed-upon definition of "active". Is it a CHV who not only provides health education but also goes door to door providing advice on health care? Do feelings of confidence or trust participants may feel in one CHV over another play a role in acquiring health knowledge? Only ethnographic research (including in-depth interviews and observations in the various sites) could provide such information, and that is lacking in this data.

Although the class-related and community-related data provide no real clues as to why HEAL participants acquire more health knowledge than those who receive only specific health education from a CHV, there is a hypothesis that I would propose for further research. There may be a connection between reading about health and hearing about health that cements the health knowledge through the HEAL program in a way that is not present in the other two non-formal education approaches, where literacy is not paired with either health education materials or with the presence of a CHV. As one participant in a HEAL class said:

> "In the village, I used to hear about the kinds of things we learned in Diyalo (the HEAL post-literacy book). People used to talk about it, things that can happen. But then when I read it in the book, I felt it was really true, and that it can happen to anyone. It's not just stories or rumors. The book confirmed it for me. So if we are able to read, then we will

> understand more what we are hearing, and what we didn't know before." (Smith, 1994, p. 45)

Or, as a Maternal and Child Health Worker commented, "It is really difficult to make someone who is completely illiterate understand about health. But now since they have acquired some literacy skills, it has been easier to get them to understand." (Smith, 1994, p. 44) It may be that the combination of hearing information about health from the CHV, then reading about it in the literacy curriculum, and/or receiving supplementary lessons on health during the HEAL basic course, helps a HEAL participant to internalize the information. Hearing about health information may be more trusted and more powerful when accompanied by reading something in print, especially to women for whom literacy is equated with power and status. Reading about health seems not to be enough, since literacy-only participants also read about health in the basic literacy curriculum. It seems plausible that the difference in health knowledge acquisition derives the combination of reading about health in the basic or post-literacy curriculum, hearing about health from a CHV, who was also part of the literacy class (either as a fellow participant or as an aide to the facilitator), and receiving supplementary health lessons during the basic course. This multi-faceted approach to conveying information seems to help participants acquire more health knowledge and to believe in the knowledge they do receive through print.

Since the HEAL model is designed around the provision of health/literacy education for female CHVs and the mothers with whom they work, it builds on the foundation of CHVs already working in the villages. Based on these results, it appears that the HEAL project is the best overall approach of the three non-formal education

approaches studied here for promoting correct knowledge of health issues. However, further studies should look more closely at the hours of instruction, comparing CHV/health education only with HEAL hours of instruction at both the basic and post-literacy levels, in order to understand the cost efficiency relative to knowledge gain. In this study, information is unavailable about how long the CHVs in the HEAL sites had already been providing health education to the women in these sites before the HEAL project began; however, one hypothesis from this research might be that the HEAL project, for the time involved (six or nine months), and building on the female CHVs' previous training, is a more efficient way of educating rural women about health than health education or literacy education alone.

Increases in health knowledge, however, do not immediately translate into differences in attitudes and practices. Whether such changes take longer periods of time to manifest, or whether there are other factors (such as lack of resources, power relationships within the household, or cultural constraints) that prevent changes in knowledge from being felt as changes in beliefs or practices, is not clear from this research. Recent research on the connection between contraceptive use and women's autonomy indicates that among women who have more mobility and decision-making power in the family, contraceptive use increases (Stash, 1995). The role of literacy and/or health education in increasing women's autonomy and empowerment is unclear and certainly much beyond the scope of this exploratory study, but longitudinal research that follows women over time may hold the key for understand if, when, and under what

conditions health knowledge acquisition may translate into different attitudes and behaviors in health.

CHAPTER 7

CONCLUSIONS

Analysis of Findings

This exploratory study had two primary questions: (1) To what extent is there a difference in literacy skills and health knowledge acquired between women who receive literacy instruction, women who receive literacy instruction with a health focus, women who receive instruction in health without literacy, and women who receive no non-formal education at all?, and (2) What are some of the factors or "influences" that might explain possible differences between these groups of women? A number of hypotheses accompanied each of these two questions, and the results of the study in relation to those hypotheses is presented below.

Clearly, education makes a difference in women's acquisition of literacy skills and health knowledge. It is not surprising that there is a difference in both literacy skills and health knowledge between women who have received some type of education and women who have received no education. It would be amazing, indeed, if women could pick up reading and writing skills without specific instruction, and, although comparison group women did exhibit some knowledge of health concepts, probably gained through exposure to radio and health service staff, it is extremely minimal compared to the health knowledge demonstrated by women who had attended school or participated in any type of non-formal education. Thus, it does appear that women who participate in some type of non-

formal education will acquire more literacy skills and health knowledge than women who have not participated in non-formal education.

With regards to the second hypothesis that women who participate in an integrated literacy/health program will acquire more literacy skills than women who participate in a "literacy only" program, the extent of difference in literacy skills acquired through the different approaches does not seem to be large enough to warrant a claim that an integrated approach (combining health and literacy) at the basic course level is superior to offering a course that is unintegrated. Although there is clearly a difference between level of literacy skills acquired by participants in the HEAL sites and level of literacy skills acquired by participants in the Production Credit for Rural Women project sites, I cannot draw the conclusion that the HEAL project is, in and of itself, more successful at imparting literacy skills, since there is no significant difference in literacy skills acquired by HEAL subjects and skills of those subjects in the CHV/health only sites who had previously attended a non-formal literacy course. Thus, it seems that the Production Credit for Rural Women project approach, rather than the "literacy alone" approach, is not as successful as the HEAL approach, but, more importantly, educational approach itself is not the primary factor. The integration of health education into a literacy program, at least as it was presented in the HEAL program, does not necessarily mean that participants will gain more literacy skills. However, it also does not mean that they will necessarily gain less skill, which casts doubt on the hypothesis that the inclusion of health education will automatically "take away" from the time needed to acquire literacy skills.

Based on this exploration, I reject the hypothesis that integration of health with literacy makes a significant difference to the level of literacy skills acquired by women.

In relation to the third hypothesis in the first research question, that women who participate in a post-literacy/health program will acquire more literacy skills than women who participate only in a basic-level non-formal education program, that hypothesis does seem to hold up. The lack of difference between schooled participants and HEAL basic course completers in literacy skill achievement, and the dramatic and significant increase in literacy skills acquired by those subjects who completed the HEAL post-literacy course is among the strongest evidence in the study. Granted, the number of schooled subjects is small, so it is impossible to generalize. However, the fact that there is no significant difference in literacy skills between schooled subjects and HEAL basic course completers means that, at least for this sample and as a hypothesis for further research, literacy skills acquired through the HEAL six-month course are equivalent to those acquired in an average of 4 years of schooling, and the literacy skills gained by HEAL post-literacy course completers are better than the skills of a subset of subjects with an average of four years of schooling. A broad and extensive study of the comparative cost effectiveness of four years of schooling vs six or nine months of non-formal education would undoubtedly indicate that non-formal education is less costly in terms of time and resources than schooling. This is not to deny the other skills, attitudes and knowledge gained during schooling, nor to suggest that girls should not go to school in favor of attending literacy classes. What it implies, however, is that non-formal education "works", compared to

schooling, in helping women to acquire literacy skills, at least as demonstrated through the HEAL project.

In relation to the hypothesis that individual, class-related and community-related factors may influence literacy acquisition and thus provide an explanation for differences between groups, it appears that differences in literacy skill acquisition seem to be dictated more by the specific class situation itself than by individual demographic factors or by whether the educational approach is literacy alone or an integrated approach. Since the qualitative analysis supports the finding that class-related factors, such as facilitator characteristics, may be important in how well the participants in each class acquire literacy skills, and the quantitative analysis indicates that no individual demographic factors (such as age or marital status) are predictors of literacy achievement, I lean towards the hypothesis that what the facilitator and the participants "put into" the class is of more importance than the type of non-formal education approach. It appears that the amount of time the participant actually spends in class (hours of instruction) is the single most important factor in how much literacy she will acquire, and not owning a radio, living farther from the class, and being in the PCRW literacy program were associated with dropping out. In short, the most reasonable hypothesis emerging from this exploratory study in relation to literacy skills acquisition is that the level of literacy skills acquired will be greater, regardless of non-formal education approach, if the facilitator can provide the maximum number of hours possible, and the participant feels motivated and able to attend the class for greater lengths of time. One would surmise that participants might be encouraged to persist if they feel confidence in or affinity with the facilitator, if they have

high internal or external motivation, or if participants experience better economic status individually or in the community.

Although there may be differences from class to class, overall, well-implemented non-formal education can be very effective in helping those adult women who are beyond schooling to acquire literacy skills at least as good as their schooled peers, and for an additional three months of post-literacy instruction, they appear to acquire literacy skills better than those retained by peers with a primary level of schooling. Whether such literacy skills can only be acquired only through a project like the HEAL project, or whether larger samples would demonstrate the benefits of non-formal education implemented by other organizations and in other contexts, needs further investigation. Since the HEAL project was a pilot project, there may be something inherently superior in its implementation as demonstrated by this study, as opposed to the specific nature of its integrated health/literacy approach, but further research investigating non-pilot HEAL classes compared with non-formal education classes implemented by other organizations and compared with schooling would help determine whether it is the HEAL approach specifically or non-formal education in general which helps participants acquire literacy skills equivalent to schooling.

The hypothesis that participation in non-formal education, and specifically integrated health/literacy education, appears to be upheld from this data. Non-formally educated women in this sample did demonstrate more health knowledge than women in the comparison group. It also appears that something about the HEAL approach, or the way the program is implemented, does lead to increases in health knowledge acquisition

that are significantly different from the level of knowledge acquired by CHV/health only or literacy only subjects. However, the hypothesis that completion of the post-literacy health class will be associated with greater health knowledge was not borne out by the analysis. Individual factors do seem to influence health knowledge acquisition, and factors such as marital status, age, radio ownership and number of children are more important than in literacy skill acquisition (where individual factors are not predictors of achievement) in predicting health knowledge acquisition. It appears that these individual factors may even be more important than class-related or community-related factors in determining how much knowledge a woman will acquire through non-formal education. It stands to reason that those individual factors that are prerequisites to "motherhood" (being older, being married, having children) would be important to a woman having greater knowledge about the health topics under study, many of which are related to fertility or children's health, such as immunization, family planning, birth spacing, and oral rehydration therapy. What is interesting is that radio ownership is associated with greater health knowledge acquisition; since radio programs in Nepal contain periodic information about health issues, it is an indication that the messages heard over the radio and the messages learned in either the Mothers' Group or the literacy class reinforce each other.

The "reinforcement" factor of radio ownership and motherhood strengthens the hypothesis about why the HEAL program seems to be related to greater health knowledge acquisition than other types of non-formal education. It may not be that the specific instructional design of the HEAL approach per se that is positively related to health knowledge acquisition, but the fact that the HEAL program provides more mechanisms

for reinforcing what women are hearing from the CHV, over the radio, from the health post staff, and from other mothers. The literacy instruction itself, coupled with active CHV intervention, may be as much a key to the increases in health knowledge acquisition as the supplementary health lessons included in the HEAL basic course.

However, the increases in health knowledge acquisition that seem to be gained from participation in a post-literacy course (even though they were not significantly different than knowledge gained through the basic HEAL course) would argue positively for a non-formal education approach that lengthens the time of instruction. Again, since we have no information in this data set about women completing non-health related post-literacy courses, it is difficult to draw the conclusion that it was the specific focus on health content in the post-literacy course that accounted for increases in health knowledge acquisition; however, it is clear that integrating health with literacy instruction at the post-literacy level did not decrease either health knowledge or literacy skill acquisition, since both increased after the post-literacy course.

Thus, while on the basis of the data included in this exploratory study I reject the hypothesis that type of non-formal education approach makes no difference in health knowledge acquisition, it is not at all clear whether it is the integration of health and literacy in one course that makes the difference or whether it is something unique about literacy that reinforces the health messages delivered by CHVs, mass media or other health post staff. This is supported by the significant difference between literacy-only subjects and HEAL subjects in health knowledge acquisition, when controlling for literacy skills. I would propose that the power of literacy and the power of reading about health creates an

impression that, when coupled with information received aurally, cements the knowledge gain in a way that is not as strong or lasting among women who receive information only through health education or only through literacy.

Recommendations

While this study was exploratory, and the data set does not provide enough information for making conclusions strong enough to influence policy, it does seem reasonable to make a few recommendations to policy makers and program planners for consideration when implementing programs. These recommendations are presented in order based on the strength of the evidence in the data.

First, any type of non-formal education is significantly more effective in imparting literacy skills and health knowledge than no education at all, and literacy acquired non-formally seems to be as good a foundation as schooling for the acquisition of health knowledge, so health promoters should support literacy efforts in general, either integrated or non-integrated with health content. Second, a health/literacy program that is paired with instruction from a CHV seems to be the best method for helping women acquire health knowledge, probably because it allows for transmitting and reinforcing health messages through a number of media: in the literacy materials, from the supplementary materials, and from the CHV. Third, longer periods of instruction are associated with greater acquisition of literacy skills and health knowledge, so both educators and health promoters should consider the feasibility of funding nine-month,

rather than six-month, programs. Fourth, because hours of instruction seems to be the key factor related to greater acquisition of literacy skills, literacy program planners should pay attention to facilitator selection, recruitment, and training, as well as to the obstacles that women face economically, if they want to increase completion rates and literacy skill acquisition. Fifth, women do seem to receive health information from the radio and from whatever contact they have with other mothers or health service staff as a result of being married and having children, so health messages should be continued to be conveyed through mass media and personal contact even when health and/or health/literacy programs are offered.

A recommendation about research design is appropriate here, based on the limitations of this study. A broader sample, better data collection, and a design that includes ethnographic observation would significantly improve future research about the relationship between type of non-formal education program and literacy skills and health knowledge acquisition among women. Ideally, research that seeks to provide information for program planners and policy makers needs a good balance of comparative and ethnographic data from which to draw conclusions about effectiveness of various approaches and about why some approaches appear to be more effective. In this exploratory design, the quantitative data was limited by questions of reliability and validity, but more importantly, contextual data was lacking that would have allowed for more appropriate triangulation of even the data that did exist. In other words, ethnographic data collection that can provide a richer picture of what the class-related and community-related factors really are in each setting--the social, economic, political and

cultural influences that matter to learning--is a necessary part of any educational research. Simply put, it will not be enough to have rigorous, reliable, and valid comparative data if information about the reasons for differences in skill and knowledge acquisition cannot also be presented and analyzed.

Hypotheses for Further Research

There are a number of hypotheses generated by this study that can provide a starting point for future researchers. One is that type of non-formal education does not make a significant difference in literacy skills acquisition but it does make a difference in health knowledge acquisition; specifically, a non-formal education approach that integrates health and literacy and is coupled with the efforts of a CHV is the most effective for health knowledge acquisition. Another hypothesis is that site factors (factors related to the class or the community) affect literacy skill acquisition, and individual factors (marriage, age, ownership of radio, number of children) affect health knowledge acquisition. The most important of the site factors for literacy skill acquisition is hours of instruction. The specific site factors that make level of achievement in literacy vary are most likely to relate to some characteristic of the facilitator (such as age, gender, ethnic group membership, education level, activity level or interaction with the participants) or to the economic status of the individual or the community. The individual factors that have the strongest impact on health knowledge acquisition are marital status, age, and ownership of radio, and for married women, number of children. A final hypothesis for future research is that

health knowledge acquisition does not automatically or immediately lead to changes in attitudes and practices in health across the board.

If I were to do follow-up research to this exploratory study, I would focus on the collection of information that seeks to uncover the classroom and community factors that seem to relate to literacy skill and health knowledge acquisition, and I would focus on why and how such factors as number of children, radio ownership, and literacy seem to reinforce the influence of CHV education on women's health knowledge. At this point, I am most interested in women's perceptions of how literacy serves as another mechanism for receiving information about health, and what and when they will use such information to make changes in their lives. Such research would require much more in-depth ethnographic and qualitative methodology than was included in this data set. I feel that the questions have only been partially answered; what I learned here is enough to make me an advocate of integrating literacy instruction with health education, and an advocate of increasing the instruction time to make the basic literacy course nine months rather than six months, but I feel that I do not have more than a hypothesis to be able to answer health educators' questions about <u>why</u> literacy is a significant force in increasing health knowledge.

APPENDIX A

LITERACY TEST

पहिलो तह:

साक्षरता मूल्याङ्कन प्रश्नावली

निरन्तर शिक्षा नेपाल

२०६२

१) नाम थर ..... उमेर.....

ठेगाना .....

जिल्ला ..... गाउँ.....

२) जित हेरी मिल्ने शब्दमा | ✓ | चिनो लगाउनोस् ।

| गोदा | गोदा | घोडा |

| गोरी | गोरी | टोपी |

| कलिला | किताब | तकिया |

३) जित हेरी त्यसको नाम लेख्नोस्

| | | | |

४) एक देखि दशसम्मा अंक लेख्नोस् ।

५) उत्तर लेख्नोस्

दोश्रो त

साक्षरता प्रश्नावली

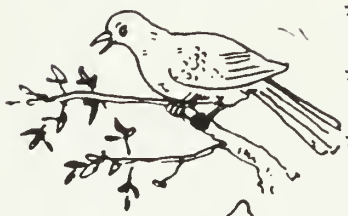
विश्व शिक्षा नेपाल

२०४९

नाम थर: ..... उमेर:.....

१) चित्र हेरी मिल्ने वाक्यमा यस्तो [✓] चिन्ह लगाउनुहोस्

गोठमा भैंसी छ ।
गोठमा पाठो छ ।
गोठमा कुकुर छ ।



चरा छानामा छ ।
चरा हाँगामा छ ।
चरा घरमा छ ।

थालमा स्याउ छ ।
थालमा केरा छ ।
थालमा अम्बा छ ।

केटा बल खेलिरहेछ ।
केटा किताब पढिरहेछ ।
केटा भात खाइरहेछ ।

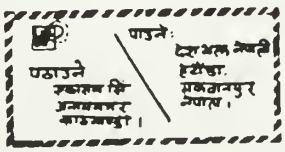
हातमा पाँच औंला छन् ।
हातमा चार औंला छन् ।
हातमा तीन औंला छन् ।

२) चित्र हेरी वाक्य पूरा गर्नुहोस् ।

केटा _____

_____ खेलिरहेकोछ ।

बांदरले केरा _____



यो _____ हो ।

केटाको _____ छ ।

३) खाली ठाउँ भर्नु होस्:-

धुवाँले आँखा ..... हुन्छ ।

पखालाको औषधी बनाउन नून, चिनी र ..... चाहिन्छ ।

मौरीको मह ..... हुन्छ ।

कुखुराले ..... पार्छ ।

बच्चालाई ..... खानेकुरा ख्वाएमा पखाला लाग्छ ।

४) तलका वाक्यहरू पढ्नुहोस् र सोधिएका प्रश्नहरूको जवाफ दिनुहोस् ।

रमाको छोरो विरामी छ उसलाई पखाला लागेको छ । तिर्खाले मुख सुकेको छ । उसले पानी मागिरहेको छ । रमाले पानी दिएकी छैनन् । यसैले उ कमजोर भइरहेको छ ।

रामबहादुर रमाका छिमेकी हुन् । उनी लेखपढ गर्न जान्छन् । रेडियो सुन्छन् । उनलाई पखालाको औषधि थाहा छ । त्यसैले रमाको छोलाई नून, चिनी, पानी खुवाउने सल्लाह दिन्छन् । रमा त्यसै गर्छिन् । छोरो विशेक हुन्छ ।

क) को विरामी छ ?

ख) विरामीलाइ के भएको छ ?

ग) विरामी किन कमजोर भएको हो ?

घ) रमालाई कसले सल्लाह दियो ?

ङ) रमाले छोरालाई के खुवाइन् ?

५) सबभन्दा ठूलो अङ्कमा घेरा लगाउनुहोस् ।

६, २५, ३७, ८५

६) सबभन्दा सानो अङ्कमा घेरा लगाउनुहोस् ।

७, १८, २७, ७७

७) कति पैसा हो अंङ्कमा लेख्नुहोस् ।

८) उत्तर लेख्नुहोस् :-

४६३		४६३
+ २०१		+ १२९
७५	४५२	
- ३४	- १०२	
७		४०
X३		X६

९. राम सिंहका ३ जना दाजुभाइ थिए । ६० वटा गाई थिए । सबैले बराबर बाँडे । अब भन्नोस् राम सिंहले कति पायो ?

क) जम्मा गाई
ख) बाँडनु पर्ने मानिसको संख्या
ग) राम सिंहले पाएको गाई

साक्षरता मुल्याङ्कन प्रश्नावली
विश्व शिक्षा/नेपाल
२०४९

१. नागरिकता लिन तलको विवरण भर्नूहोस् ।

नामथर .....
उमेर .....
गाउँको नाम .....
वडा नं .....
गा.वि.स. .....
जिल्ला .....
पिताको नाम .....
लोग्नेको नाम .....
स्वास्नीको नाम .....

२. चित्र हेरी सुहाउंदो शब्दमा गोलो (०) चिन्ह लगाउनुहोस् ।

उदाहरण: यो चित्र (गाउँ)/शहर/वजार को हो ।

क. घर नजिकैको धारा/इनार/कुंवामा पानी थापिरहेको छ ।

ख. गाई, गोरु र बाख्राहरु चउरमा खेल्दैछन्/चर्दैछन्/बस्दैछन् ।

ग. रुखको छहारीमा बस्न गाउँलेहरुले दुङ्गा/बाँस/मुढा को चौतारो बनाएका छन् ।

घ. धारा नजिकैको घर खरले छाएको छ । यो घरलाई पक्की/बंगला/कच्ची भनिन्छ ।

३. चित्र हेरि खालि ठाउँ भर्नुहोस् :

उदाहरण: कालो सारी लगाएर समूहमा उभिएकी महिलाले करेसावारी वनाउन (सल्लाह) दिदैछिन् ।

क. घरको ( ) करेसावारी लगाएको छ ।
ख. कलम लिएकी महिलाले लोग्ने मानिसलाई ( ) सोध्दैछिन् ।
ग. कलम लिएर कापीमा जवाफ ( ) लागेकीछिन् ।
घ. सानी छोरीलाई आमाले ( ) सिकाउँदैछिन् ।

४. जवाफ लेख्नुहोस् ।

गाउँमा धारा, कुंवा र इनार छैनन् । खोलामा वाढी आएर पानी फोहोर भएको छ । सफा पानी नखाए विरामी परिन्छ । अव तपाई के गर्नुहुन्छ ?

५. तल दिइएको कुरा पढ्नुहोस् ।

वेलटार गाउँका मानिसहरु चौतारोमा भेला भएका छन् । प्रौढ शिक्षिका भन्दै हुनुहुन्छ - "हामीले काललाई निम्तो पठाईसकेका छौं । घर छेउछाउ फोहर फाल्ने, जहाँ पायो त्यही दिसा पिसाब गर्ने, पानी फोहर बनाउने हामी नै होइनौं त ? पोहोर साल हाम्रो गाउँमा हैजा पनि आएको थियो । यस्तो कुरा सुनेर गाउँलेहरु झस्किए । अब त कुनै उपाय नगरी भएन बा!

क) उदाहरण हेरी ठिक/वेठिक लेख्नुहोस् ।

उदाहरण: [X] वेलटार गाउँ सफा छ ।

[V] वेलटार गाउँ फोहर छ ।

[ ] वेलटार गाउँका मानिसहरु विद्यालयमा भेला भएकाछन् ।

[ ] वेलटार गाउँका मानिसले जथाभावि दिसा पिसाव गर्छन् ।

[ ] वेलटार गाउँमा हैजा पनि आएको थियो ।

[ ] वेलटार गाउँमा खानेपानी सफा छ ।

(ख) गाउँलेहरु के सुनेर झस्किए ?

.....

७. हिसाब गर्नुहोस ।

क. ६ ४ ५	ख. ६ ७ ४	ग. ५ ६	घ. ५)९०(
+ ७ ८ ९	− २ ४ ५	X ९	
———	———	———	

८. तलका प्रश्नहरुको जवाफ दिनुहोस् ।

(क) कतिवटा बीसको नोट भयो भने रु. १०० बन्छ ? .....

(ख) कतिवटा पचासको नोट भयो भने रु. ५०० बन्छ ? .....

(ग) रु. १०० को नोटमा कतिवटा रु. ५ को नोट हुन्छ ? .....

९. समाधान गर्नुहोस ।

वजारमा एक किलो आलुलाई १० रुपैया पर्छ । कमलीले यो महिनामा ५० किलो आलु बेचिन् । त्यसबाट उनले ५० रुपैयाको कापी, १०० रुपैयाको किताब किनिन् र स्कूलको फी ५० रुपैया तिरीन् भने अब उनीसंग कति बाँकि होला ?

(क) कमलीले जम्मा कति कमाइन् ? .....

(ख) कमलीले जम्मा कति खर्च गरीन् ? .....

(ग) कमलीसँग कति बाँकी छ ? .....

APPENDIX B

HEALTH KNOWLEDGE INTERVIEW

Health Knowledge Interview

1. What is Jeevan Jal (oral rehydration solution) for?

   A. How do you make Jeevan Jal?

Mix the whole packet?	Yes	No
Put whole packet in six glasses of water?	Yes	No
Dissolve the packet completely?	Yes	No

   B. If you cannot find Jeevan Jal in your village, what else can you feed someone who has diarrhea?

   C. For how long should you give Jeevan Jal to a sick child?

2. How many immunizations do you have to give a child?

   A. When do you have to start the first immunization?
   B. At what month intervals do you have to give subsequent shots?
   C. By what month should the last immunization be given?

3. Why do you immunize a child?

4. By giving immunizations, which diseases can you save your children from? (Circle all mentioned)

   TB Tetanus/whooping cough/diphtheria Polio Measles

   Other

5. Name two contraceptive methods:

6. If you or your husband are using contraception, what's the name of it?

7. In your opinion, how many children should one have?

   How many sons?_____ How many daughters?_____

8. Should a pregnant woman smoke or not?

   If she does what are the effects on her health?

9. What is the minimum number of years between the births of children?

If you do have children before the minimum number of years, who is affected and how?

10. Do you have any other place, besides the outdoors, to urinate or defecate?

11. If you don't have a toilet/latrine, what has prevented you from making one?

12. When your child gets sick, who's the first person you seek advice from?

13. If your child becomes really sick, where do you go first?

    A. If his/her advice doesn't work, where will you take your child the next time?

    B. After that, where do you go?

14. In what situation do you have to take a child to the health post?

15. In what situation do you have to take a child to the hospital?

16. How is AIDS transmitted (how does someone get it?)

17. How does someone get intestinal worms?

18. If a dog bites someone, what do you do? (Check and/or list all mentioned)

    Wash the wound____ Bandage the wound___ Other___

19. How is drinking water contaminated? (Check and/or list all mentioned)

    Water not clean_____ Buffalos swimming____ Washing clothes___

    Other____

    How do you purify dirty water?

APPENDIX C

COMMUNITY CONTEXT/VILLAGE PROFILE INTERVIEW FORMAT

INSTRUMENT #8
COMMUNITY CONTEXT/VILLAGE PROFILE
INTERVIEW FORMAT

(To be asked of community leaders)

Village or community _____ Ward No._____

1. No. of households_____ Population_____

2. Which ethnic groups live in the community?

Ethnicity	How many in household?	Significant characteristics
_____	_____	_____
_____	_____	_____

3. Amount of time needed to reach the nearest and most convenient organizations (hours/minutes)

School_____

Campus_____

Health Center_____

Hospital_____

Nursery_____

Post Office_____

Agricultural Farm_____

Service Center_____

Co-operative_____

4. What is the pattern of migration and what the reasons for it?

_____

5. Do people go abroad to find work? How many have gone?

_____

6. Condition/situation of the following facilities:

Clean drinking water_____

Electricity Supply_____

Road (indicate distance in hours/minutes)_____

Bazaar (indicate distance in hours/minutes)_____

7. Foods grown in this village:

_____ _____

_____ _____

8. Situation of the forest in this village:

_____

9. Number of illiterates above 10 years of age:_____

10. What is the educational situation in this village and why?_____

_____

11. What do the people do to earn their living besides agriculture?_____

_____

12. What is their staple food?_____

_____

13. What kinds of development activities have happened in this village during the last several years?

Activity	Date
_____	_____
_____	_____
_____	_____

Names and positions/status of people consulted in filling out this interview:

Names	Position
_____	_____
_____	_____
_____	_____

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